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Ontario Hydro
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Publications





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the cover

In her day, the Martin Karlsen has plowed through the icy waters of the Antarctic and starred as a whaling vessel in the Alan Ladd movie "Hell Below Zero." Now she's used as a floating laboratory to gather scientific information about the Great Lakes for the Canada Centre for Inland Waters (see page 17).

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Viewpoint

On the brighter side

While the first year of the new decade has brought us a full share of problems here at Hydro, it has not been without its satisfactions and there is room for optimism on several fronts as we enter 1971.

The ability to meet all demands for power remains the primary concern and the reserve situation is healthier than it has been for some time. Dependable resources exceeded peak demand in December by about 11 per cent and no difficulty is anticipated in meeting customer requirements throughout the winter.

Fuel shortages are the latest spectres haunting many US utilities and while Hydro has also experienced shortfalls in its coal deliveries, the situation is far less critical here than in some jurisdictions south of the border where most of our coal originates. Many factors account for the anomaly but Hydro can take credit for its foresight in pioneering long-term coal contracts which have enabled US suppliers to develop mines, docking, storage and other facilities designed primarily for their trade with us.

Inflation remains the most damaging and all-pervasive element working against the production of low-cost power and the picture is brighter but unpredictable. Recent fiscal and monetary measures by the government have taken some of the steam out of inflation but there is some fear that the improvement may be short lived.

Trends and projections all suggest that the cost of power will continue upwards for most of this decade, at least, and while this is distressing there is some comfort in numbers. Utilities and their customers across the continent and beyond are having to live with the same problem - considerably more acute in most instances.

Viewed against the prevailing background of rising costs and rising incomes, electricity will continue to represent excellent value for the money.

We can be optimistic, too, that environmental and other problems will not reach the point where they result in power shortages and brown-outs. These have already occurred in some parts of the US where the situation remains critical and is of growing concern to government, industry and the public.

Hydro enjoys a time lag over many of its US counterparts who operate in a more densely populated and more highly exploited environment. We are determined to make the most of this opportunity to gain public acceptance through our actions in meeting vital power requirements at the least possible cost to the environment. We recognize the dangers and share the concern held by all responsible people with regard to the environment and its delicate ecosystems.

Hydro accepts its responsibilities in this area and does not regard them as being in basic conflict with its fundamental responsibility which is to provide a reliable supply of electric power in the amounts society decrees it must have.

Electricity is what makes the wheels go 'round and it holds out the promise of a cleaner, richer and more satisfying tomorrow. Methods will be found to provide it which are compatible with the best interests of society. □

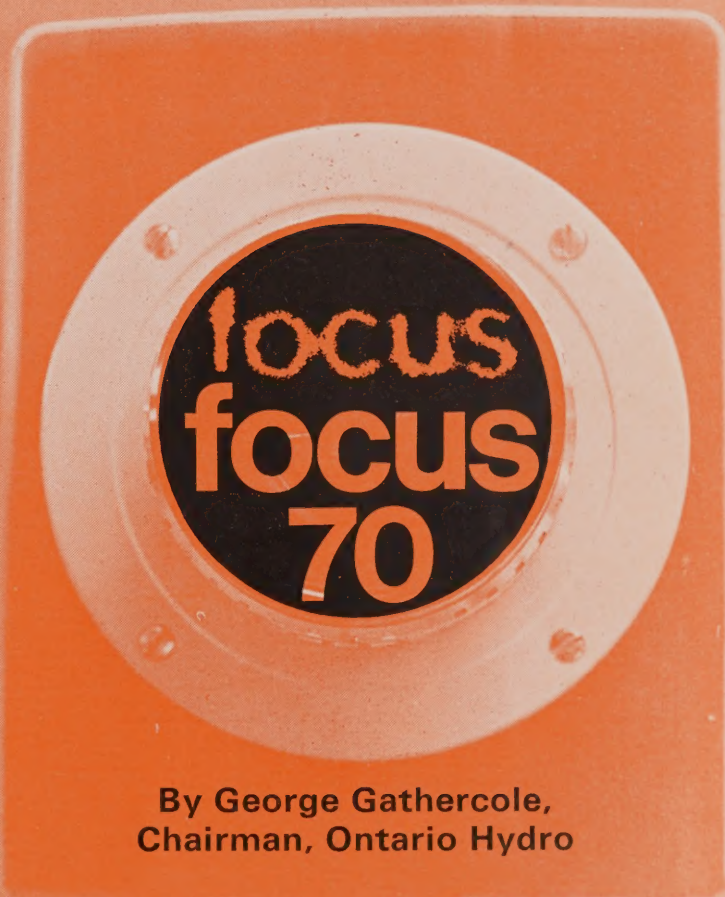
focus on costs

One of the most difficult readjustments we are having to make in meeting the relentless growth in the demand for electricity as we enter the seventies is the change in the theatre in which we operate. It is growing more crowded, its furnishings are more delicate and the audience is more sophisticated and critical.

It has been pointed out often enough that Hydro, in a single decade, will have to double the capabilities of the system it has built up over 60 years of steady progress. What isn't so readily understood is how this enormous task will have to be carried out under new and much more difficult ground rules.

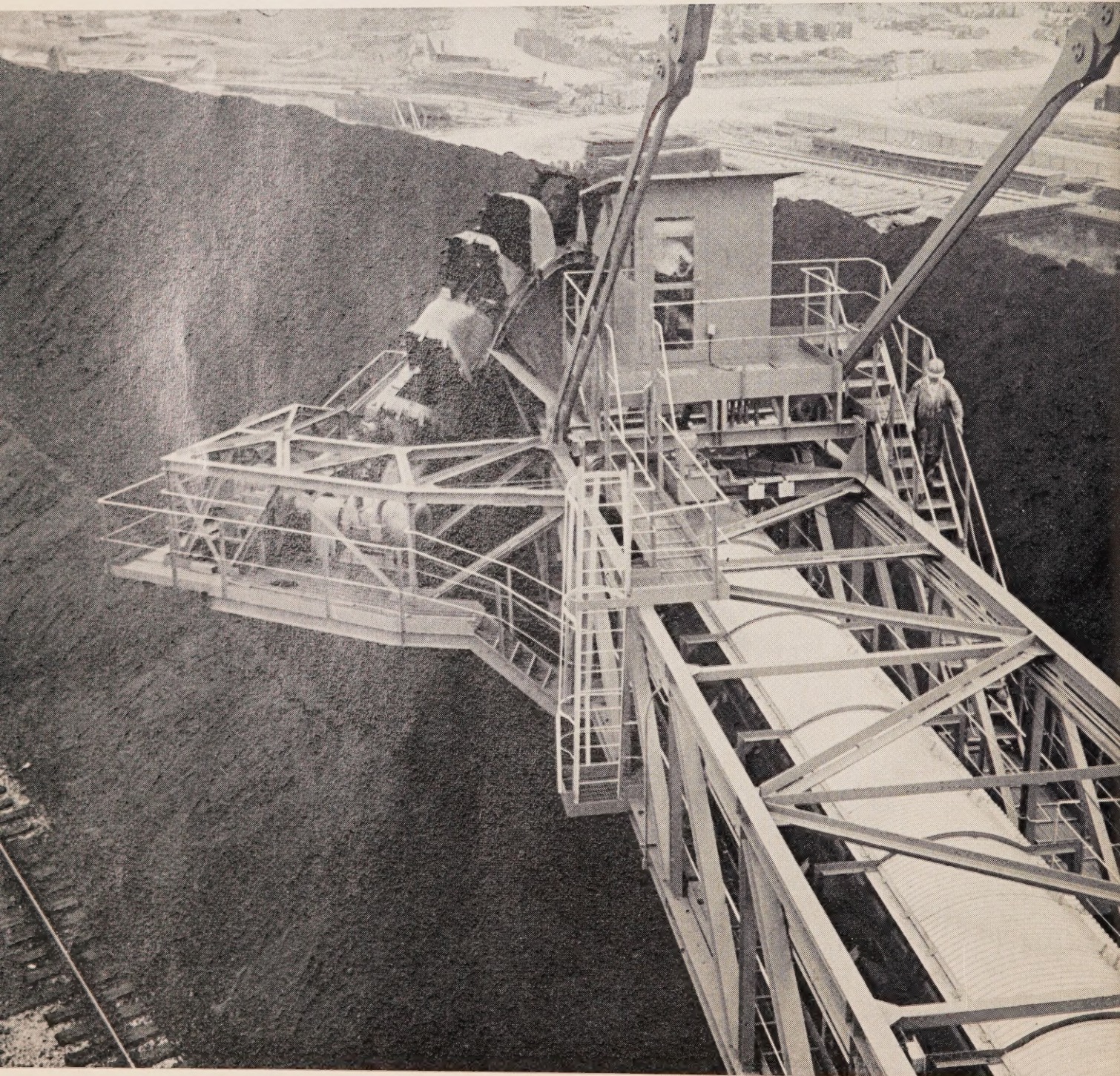
So many things have changed. Acquiring property for generating stations and transmission lines is more involved and far more costly. Major water power sites have been exhausted and the cost of fuel is going up. Interest rates are double and triple those prevailing in former years while our capital requirements are spiralling. Inflation may be easing, but it has left its stamp on the cost of our operations for many years to come. Research and other anti-pollution measures are costing more and more.

We are, in effect, starting out all over again — not only in the matter of building new plant by new technologies, but from the point of view of the business environment. Under the circumstances, it would be illogical to expect the cost of a kilowatt-hour to remain as it was 20 years ago when everything was going for us in the production of low-cost power. We can hardly expect a continuation of the privileged position enjoyed by the people of Ontario over the past 60 years.



**By George Gathercole,
Chairman, Ontario Hydro**

Huge buckets of a stacker-reclaimer eat into the coal pile at Lambton generating station, near Sarnia. As a result of increased consumption and higher prices, Hydro's fuel bill has jumped from \$35 million to an estimated \$86 million in the past four years.



ly this month, we were forced to introduce new rates for power sold to the municipal Hydro systems and to Ontario Hydro's industrial and rural customers.

Fortunately, if our projections materialize, these are only the first of a series of increases that will be necessary to maintain a viable and financially secure position capable of meeting the challenges of the seventies.

We are confident these increases can be held to modest dimensions, although we must not underestimate the persistence of inflation.

Fiscal and monetary measures over the past two years have dampened but not eradicated inflation, and there is no assurance that the present retardation, accompanied by higher unemployment, is not temporary. Our projection of an ascending trend in electric power rates should not be considered in isolation. A continuing atmosphere of inflation will generate rising costs to meet the impact of higher power rates.

Over the next seven years, we foresee a 64 per cent increase in power demands. Some people question whether we really need all this power. They suggest that Hydro has become the victim of a power complex, content on building more and more power plants for their own sake.

But electricity is essential to the economy of the province and artificial restrictions on the supply would have a direct effect on industrial and commercial activity.

We see our responsibility as building the provincial system so that it can meet new demands as they emerge. Indeed, Ontario Hydro was established to meet the needs of the province's power consumers – not to determine them.

Our further responsibility under provincial legislation is to set rates at a level which will recover the cost of providing service.

The decade ahead marks the beginning of a new era of power generation in Ontario in which we foresee a steady rise in costs due to a number of factors. Last year, thermal plants overtook hydro-electric generation in providing more than half the system's total capacity. This trend will accelerate.

The development of Ontario's hydro-electric resources – now virtually complete – took place over about six decades of broad economic growth. An adequate supply of money to develop the system was available at advantageous interest rates. The result was a supply of low-cost electric power duplicated in few places in North America.

This economic environment has changed. Money is available only at high interest rates. Hydro-electric power can no longer meet new demands and thermal units must be used. Even without inflation of goods and services, higher wages and other factors coming to bear, costs would be going up because of fundamental changes in technology and environmental attitudes.



Outer shell of the 700-foot high stack at the Richard L. Hearn plant in Toronto was completed during the year. To assist in lowering sulphur dioxide levels over the city, Hearn's eight coal-fired units are being converted at a cost of \$4 million to burn natural gas.

More and more homeowners are taking advantage of the comfort and flexibility of electric heat. The number of electrically-heated homes in the province at year-end was about 72,500, an increase of 17 per cent in a single year. The number of apartment units heated by electricity jumped from 24,362 in 1969 to about 30,000.



help meet future power needs, Ontario Hydro is pioneering in the utilization of clear power, a program that will benefit the entire country but one that inevitably involves substantial developmental costs. Another concern is the environment. Research and capital expenditures on equipment to ensure the quality of our air and water add considerably to the cost of new stations.

Greater dependence on thermal-electric stations also means providing larger reserves of power to cope with the increased number of shutdowns due to maintenance problems not associated with hydro-electric units. To achieve a larger margin of reserve, future generating capacity must increase more rapidly than the rate of growth in customer requirements.

In spite of all this, electricity remains quite a bargain. It lights our home, powers our radio, TV and stereo, vacuums our house, refrigerates our food and cooks our meals, provides hot water, washes and dries our clothes, and does countless other things with only very rare interruptions. It does all this for a monthly average charge to residential customers of the Hydro municipal utilities of about \$8.50.

There was a time when that sum went a long way, and even today for some people it is a significant amount. But conditions have changed. Virtually all commodities cost a great deal more than they did, and it seems rather unreasonable for people to expect that the price of electricity should remain the same. Although Hydro has successfully combatted rising costs, it is not, and never has been, immune to them.

In terms of everyday purchases, the average monthly bill of the residential customer will rise this year to about \$9. What else will \$9 buy at today's prices?

Well, it will buy three-fifths of a ticket to the Grey Cup, or two steak dinners, or two tickets to the theatre. One might say that these examples are frivolous, that they are not essentials and that people are not average. Some use much more electricity than this average household.

True. But here again, the amount of the electric bill looks eminently reasonable.

Ontario Hydro has a worldwide reputation and many utility systems have been patterned after it. We are constantly seeking better methods of building and operating the system. Larger generating units, increased automation — most small hydro-electric stations are remotely controlled — and tighter cost controls are examples of the continuing drive for increased efficiency and productivity within the organization.

Our power system has doubled in size in the past decade, for example, but our staff has increased by only 43 per cent.

It might be asked why, if increasing demands are compelling us to build more generating stations, we should exhort consumers by advertising to use more electricity. There are several reasons for this. The aim of our advertising program — the appropriation for which has been stable over the last few years — is to secure the economies of scale and to use our generating plants and transmission and distribution facilities more effectively by filling in the valleys between peaks or highs in demand.



Ontario farms have used electricity to lighten the workload for many years, and high agricultural consumption has paid off in terms of low unit costs. Ten years ago, the average monthly farm bill was 1.96 cents per kilowatt-hour. Today, it is 1.75 cents, a reduction of 10 per cent.

Wells generating station, fourth hydro-electric plant to tap the northern Mississagi River, began feeding power into the provincial grid last fall. Wells, which has a capacity of 203,300 kilowatts, shares a 12-mile headpond with the existing George W. Rayner station.



The electric power industry is capital intensive. Once the plant and distribution system have been constructed, the more kilowatt-hours that can be supplied the lower the unit cost. Similarly, the smaller the amount of power supplied, the higher the unit cost.

So promotion, begun by Sir Adam Beck in Hydro's early days, continues to have a stabilizing effect on our rate structure. In the last decade, for example, the unit cost of supplying electricity to farms in Ontario has remained practically the same. By reason of inflation, the total cost has risen substantially. But the average farm demand has doubled in that time so that the unit cost of power to the farmer in 1971 will be practically the same as it was 10 years ago.

To cite another case, the Tennessee Valley Authority has demonstrated the effect of a large domestic load, particularly for electric heating, on its rate structures. Despite some recent increases, TVA's rates are among the lowest in North America — a benefit derived in large part from a level of domestic consumption double that of the average in the United States and substantially larger than Ontario's.

Of course, Ontario Hydro has no monopoly in the field of energy supply. We compete with natural gas, oil and other fuels in many areas. Unless we keep people informed of the merits of electrical energy in this highly competitive, diversified and pro-

motional environment, we could be confronted, as is the case in certain subdivisions and sparsely settled parts of the province, with having to sustain relatively small demands and even more rapidly increasing costs and rates.

We believe our customers should be kept informed of the facts about electrical energy and its many uses. In this way, each individual may assess the advantages and disadvantages of each energy source and have the opportunity of making a choice.

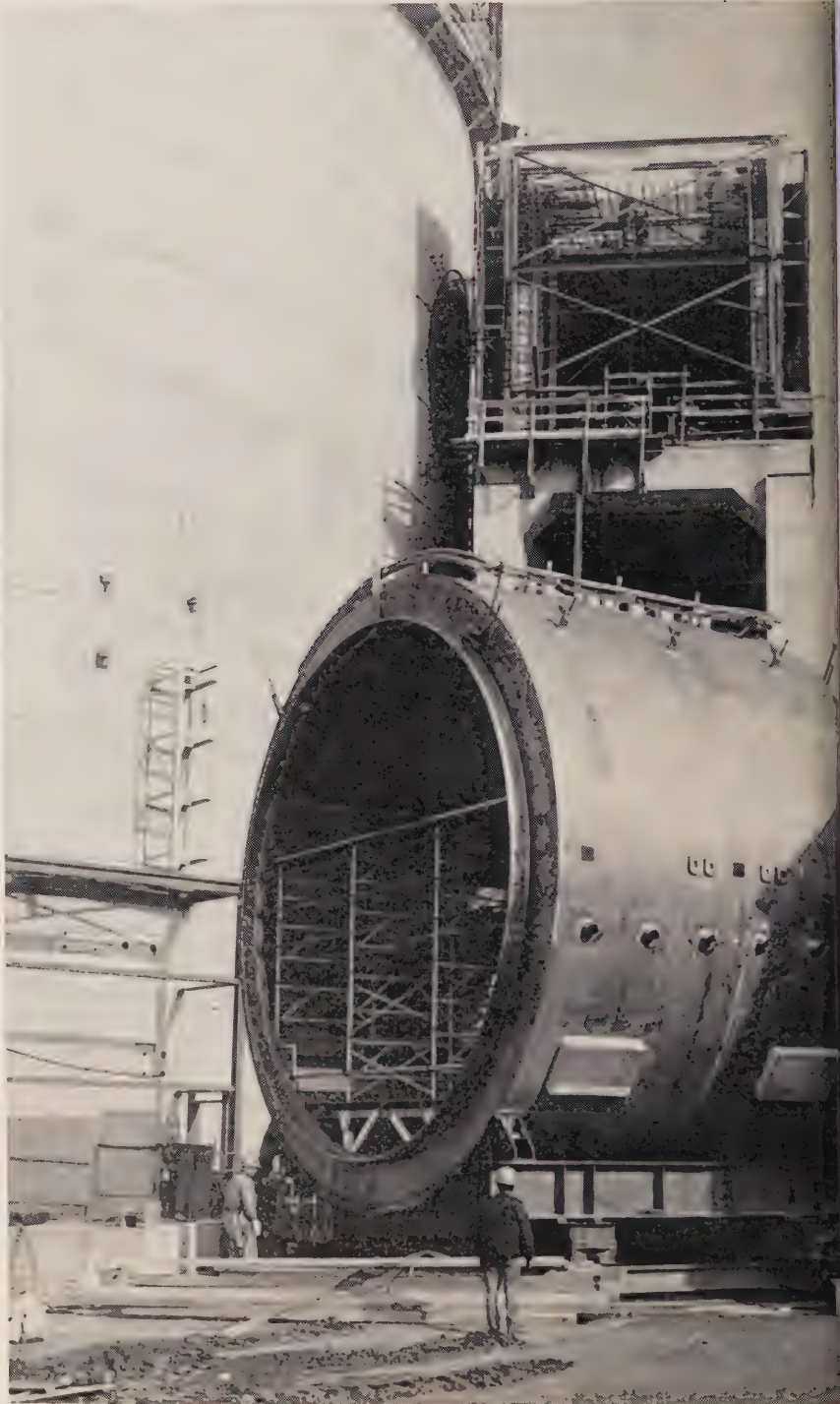
Finally, we enter the new year in far better shape, from the point of view of power reserves, than for some time. This is a result of planning. To meet future demands we must gear our construction program at least seven years ahead — the time it takes to complete a large thermal station — and today we are reaping the benefits of an adequate power supply from a program of building begun several years ago.

Only by continuing these long-term policies, and by maintaining a sound financial position, can we avoid the distressing and embarrassing plight of a number of utilities and jurisdictions which have experienced the unhappy state of not having sufficient electric energy to meet their needs. □



Aubrey Falls, also on the Mississagi, went into service in 1969. The Mississagi scheme is one of the province's last economic hydro-electric developments as increasing emphasis is placed on thermal-electric generation.

Reactor vessel is prepared for installation at Pickering power station, east of Toronto. Pickering will produce first power later this year. Much of the heavy water for Ontario's nuclear stations will be manufactured at the plant, left, now under construction near Kincardine.



focus on power

In 1970, for the first time, Ontario Hydro's thermal power resources exceeded the capacity of hydro-electric plants.

Hydro's installed capacity increased by more than 1,200,000 kilowatts during the year, bringing the total to almost 12,500,000 kilowatts. This provided a substantial cushion for a December peak load of 11,308,000 kilowatts, up 7.1 per cent from 1969.

Most of the new generation was provided by the third and fourth 500,000-kilowatt units which went on line at Lambton power station, near Sarnia, in April and September respectively. Lambton has now reached its full capacity of 2,000,000 kilowatts.

Hydro-electric resources were increased by 203,300 kilowatts in October with the completion of the two-unit Wells generating station on the Mississagi River. One more hydraulic plant at Lower Notch on the Montreal River will see service this year.

Thermal generation now accounts for 51 per cent of Hydro's power reserves compared to only 2 per cent 20 years ago. This build-up was necessary as demands for electricity steadily outstripped the power available from the province's limited hydro-electric resources.

Output from the hydro-electric stations was down slightly in 1970 over 1969. Preliminary figures, to the end of October, show that on the west system output was 3.59 billion kilowatt-hours, down from 3.64 billion a year earlier.

The east system reported output of 26.18 billion kilowatt-hours, compared to 26.7 in 1969. Water levels in both systems were below normal in the early part of the year, but had reversed themselves by fall.

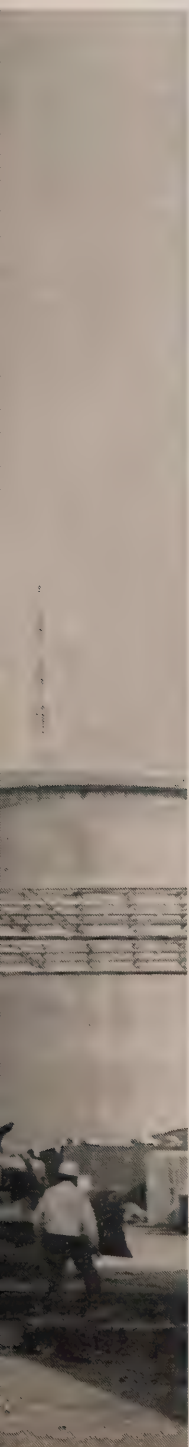
Nuclear power remained high on the list of priorities last year and work was stepped up at the Pickering project, near Toronto, in expectation of an early 1971 start-up. Construction continued at the 3,200,000-kilowatt Bruce nuclear station, on Lake Huron, scheduled to go into operation in stages between 1975 and 1978. Work on the nearby heavy water plant progressed to the point where Ontario Hydro began recruiting staff to operate the plant for Atomic Energy of Canada Limited.

Land-clearing for the 2,295,000-kilowatt Lennox oil-fired generating station began at Bath, near Kingston. Lennox will be Canada's largest oil-burning station. And on Lake Erie, the huge 4,000,000-kilowatt Nanticoke coal-fired station came closer to its start-up date of late 1971.

While work on power stations stole the limelight, linemen were erecting the towers and transmission lines that will carry the additional power.

About 1,500 miles of high-voltage transmission line were completed in 1970. The tie line joining Hydro's east and west power networks began operation at 230,000 volts this fall. Considerable progress was made on the 560-mile loop which will link the east-west tie with Manitoba and provide additional security for the power needs of Northwestern Ontario as well as bringing low-cost power from Manitoba Hydro's Nelson River project in 1972.

Problems in obtaining property for rights-of-way have affected several transmission line projects and remain a major hurdle. Delays were experienced last year, for example, in establishing the route for a 140-mile link between the Pickering and Nanticoke stations.





As usual, storms caused a number of interruptions to service, but the most serious by far occurred in August when a tornado struck the Sudbury, Copper Cliff, Lively and Field areas knocking out power to 12,000 homes and leaving death and destruction in its wake.

Three towers and one-and-a-half miles of Ontario Hydro extra high voltage line were knocked down at Coniston, in addition to the municipal outages. Utilities rallied together and restored power to most homes within 24 hours. It took less than a week to replace the high-voltage lines and towers.

Aesthetic considerations played an even greater role in 1970 in the development of new stations and transmission lines. A major study was continued to develop more pleasing transmission towers and two consulting firms were commissioned to produce designs. Rights-of-way will be landscaped and fully-grown trees planted to help screen towers.

Sales and marketing programs placed growing emphasis on the advantages of electric heat in environmental control. The number of electrically-heated homes in the province at year-end was about 72,500, an increase of 17 per cent in one year. The number of apartment units heated by electricity increased from 24,362 in 1969 to about 30,000.

Electric water heaters continued to prove their popularity with more than 80,000 units installed throughout the province during the year. Continuing interest was also shown in the home electrical modernization program under which Hydro lends money to finance new wiring, electric heating and the purchase of built-in appliances.

During 1970, Ontario Hydro supplied electricity to 353 municipal utilities, one less than in 1969. The reduction was due to the amalgamation of Fort William and Port Arthur into the single city of Thunder Bay. The new city of 100,000 was officially incorporated January 1 and became Canada's twelfth largest community in terms of its area.

Both the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities were extremely active in the municipal utility field. The AMEU emphasized training programs for employees. Courses for linemen, supervisory and office staff and marketing personnel were arranged.

The trend toward regional government occupied the time of many utility representatives, who were busy preparing briefs and conducting studies on the impact of regionalization. The OMEA pressed its contention that when utilities are consolidated they should still have the right to establish elected commissions.

A case in point involved the new Niagara region, where the OMEA called for retention of seven elected Hydro commissions. Four utilities would be eliminated under the OMEA proposals.

COMPEC — the co-operative marketing plan for electric commissions — was expanded in 1970 with the establishment of several more groups. Under the program small utilities combine their efforts and work in co-operation with Ontario Hydro in sales programs, bulk purchasing and other ventures.

Yet another co-operative venture involved eight small utilities near London, who are utilizing London PUC's computer to speed up monthly billing. □

Having long outgrown their outdated premises, several municipal utilities moved into new quarters during the year. Scarborough PUC was one which got by with a facelift, renovating two floors in its present building. Office landscaping was introduced to provide pleasant working conditions along with new furniture, improved lighting and acoustically-tiled ceilings.

OLD GLASS INSULATORS THE IN-THING NOW

At one time they sold for a few cents.
Now they fetch anything up to \$5 apiece.



By Lois Lane

Moe Shepherd, field safety supervisor with the Electrical Utilities Safety Association, has amassed nearly 200 different types of insulators, many of them glass. His son, Robert, is seen with an old insulator that was attached to the top rather than the crossarm of a pole.



The sun's rays bounce and scatter through the blues, greens, ambers, purples and reds of small, bell-shaped ornaments in dozens of antique store windows throughout Southern Ontario.

Yet these glittering objets d'art would be familiar to any lineman anywhere in the province. Suddenly, the lowly, pin-type glass insulator — at one time produced by the million and used by electrical utilities and telephone companies — has become a collector's item.

Talk about inflation! An insulator which once sold for a few cents is now demanding up to five dollars as an antique.

Dealers and glass collectors agree the item has become a curio because it was a mainstay of the early Canadian glass companies. Most of these companies have either merged or have long vanished without a trace.

The glass insulator emerged with the invention of the telegraph. It was born the day Samuel Morse tapped out the message "What hath God wrought?" from the US Supreme Court in Washington to Baltimore in 1844. Thus some of the earliest insulators were made in the United States and are still being produced by such companies as Hemingray and Brookfield.

But the real thrill for the Ontario collector of glass is to unearth an early type of Canadian-made insulator. And, in many cases, these are hard to find.

In the mid-1800s, small glass factories sprang up in Eastern Canada, usually in areas with an abundance of silica sand, the main ingredient in glass manufacturing. Those were turbulent times for the fledgling Canadian industry. Some of the most prominent companies, still noted for their

beautiful custom-made, blown pieces such as paper-weights, canes, hats, and other oddities, survived only a few years.

Some succumbed to the competition, some to poor management and some to fires which plagued an industry where men worked in temperatures of 100 degrees F or more, 10 months of the year.

The first recorded glass works in Canada, the Mallorytown Glass Works, survived for only one year. Its brief existence ended in 1840 — five years before the telegraph was invented. All glass produced by this company was blown, not moulded.

The earliest references to the manufacture of insulators in Canada mention the British American Glass Works, established in 1855, and the Montreal Glass Company, formed in 1866, both of Hudson, Quebec. Both companies made telegraph insulators



hat are easily identified by their medium aquamarine glass. And the Foster Brothers Glass Works, of St. Johns, Quebec, which operated between 1855 and 1880, was known to have insulator presses.

Making insulators at this time entailed hand-pouring the molten glass into a two-piece mould or press. The main difficulty was that the finished product required a screw thread to allow it to be attached to the crossarm.

This meant that while the glass was still pliable, a man had to press a plunger into the middle of the mould, make the necessary turns and then carefully unthread it. This process was employed for nearly 40 years at the Dominion Glass Company in Wallaceburg, a procedure which ceased only 10 years ago when it became mechanized.

Even more interesting is why the porcelain

insulator has gradually replaced its glass counterpart in the utility industry.

Reg Jones, a retired Ontario Hydro distribution engineer, says the glass insulator broke easily. In addition, the early glass insulators could not handle high voltages.

By 1900, most insulators used by the electrical companies were porcelain or glass. But the basic design of the pin-type insulator hasn't changed much from its inception over a century ago.

Jack Simpson, Ontario Hydro's line maintenance engineer, says glass insulators were used experimentally a few years ago, partly to improve the looks of transmission lines in urban areas. However, blue-grey porcelain insulators now being installed blend in more effectively with the sky. "The glass insulators came from Pilkington Glass in Britain, and were

pre-stressed," says Mr. Simpson. "The only problem is that they shatter if hit by a projectile such as a rifle bullet." Which is another reason why glass insulators are becoming scarce.

Damage by vandals to all types of insulator costs Ontario Hydro around \$30,000 annually. Every year sees orders placed for thousands of new insulators costing anywhere from 12 cents to \$33 apiece.

According to M. O. Shepherd, of the Electrical Utilities Safety Association, some of the old-style telegraph insulators were even made of rubber, to combat vandalism. They soon lost favor because they quickly deteriorated.

As for the old-fashioned but colorful glass variety, it has now moved indoors to enjoy greater prestige than ever.

When they want to peer deep into the bowels of the earth, or look inside a steam pipe, or maybe a cable conduit, they call in...

peeping tom

How does one take a peek into crevices and caverns deep underground or into pipes or boreholes narrower even than the span of a man's hand?

A team from Ontario Hydro's research division has the answer — television. They've developed several super-slim TV cameras that can be lowered into a borehole to examine a rock fault or pushed through the maze of pipes at a large thermal-electric generating station.

Pictures taken by the camera are monitored by technicians working in a van loaded with elaborate electronic equipment. Images from otherwise inaccessible places are videotaped and photographed for analysis.

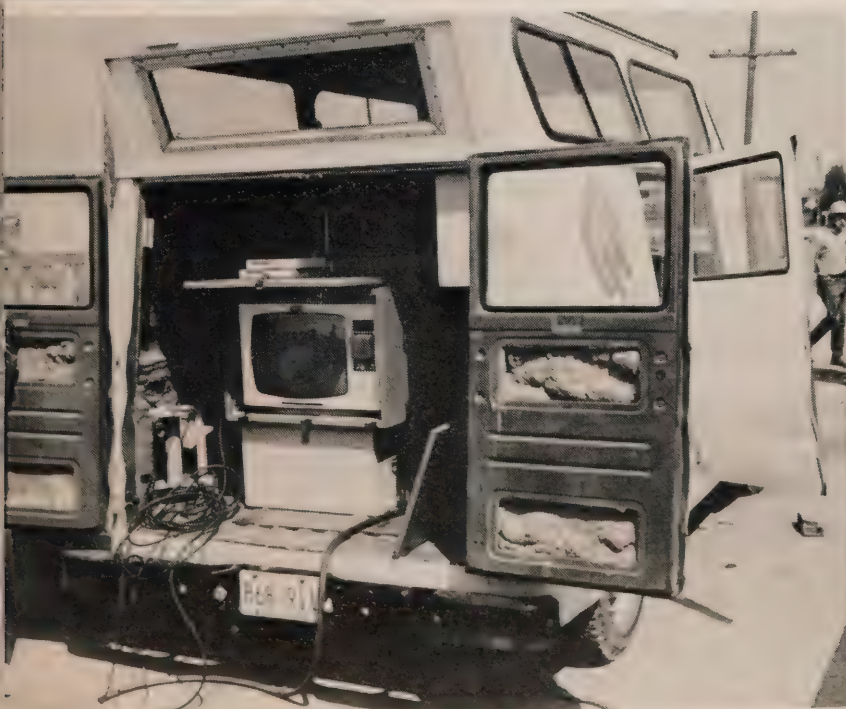
It's all a far cry from that day a dozen years ago when Hydro physicist R. C. Jacobsen constructed the first crude device from a war surplus movie camera.

Mr. Jacobsen's department was asked to check the electrical ductwork beneath Toronto's Gardiner Expressway where it crosses the Humber River. One of the ducts, which would carry cooling water, was plugged up and the engineers wanted to know why.



Image transmitted by borehole camera shows
 lying in steam pipe at Lakeview generating
 on, near Toronto. Research technician,
 is about to use camera to test the
 structure of rock walls forming the Chippawa
 river Canal at Niagara Falls.

Information transmitted to the surface by the
 per-slim camera is monitored and recorded
 equipment carried around in this special van.



The movie camera was modified to fit into the four-inch ductwork and then began the tedious job of filming the inside. Hundreds of feet of film and many hours later, the investigators were able to see that the obstruction was caused by the ductwork itself, which had sheared.

"It was about this time I decided we should consider television," says Mr. Jacobsen. "That way we could get instantaneous information."

The department bought and modified a six-inch diameter commercial television camera. Components were also purchased for a three-inch camera suitable for inspecting the insides of narrow diamond drill holes.

The first test came the following year when a strainer broke inside a steam pipe feeding one of the turbines at the R. L. Hearn station on the Toronto waterfront. Bits of mesh caught in the blades of the whirling turbine, causing them to shear off and putting the unit out of action.

All metal fragments had to be removed from the pipe before the generating unit was restored to service. The six-inch camera was rushed to the scene and, with a set of lights, inserted into the pipe. The engineers were able to see and remove the debris.

In 1960, the smaller camera was completed and used to inspect sewers in the towns of Iroquois, Ingleside and Morrisburg, which were relocated during the St Lawrence Seaway and power station development. While this was probably the first sewer inspection in Canada by TV, several companies are now in the field.

The cameras have also been employed on jobs outside the province. Shortly before construction started on Hydro-Quebec's massive Manicouagan-Outardes project, the TV equipment was used to examine 45 holes bored deep into the site of one of

Working from a temporary drilling platform over the Chippawa Power Canal, workmen prepare to bore holes down which the miniature camera will be lowered.



the proposed dams. Test drilling had revealed a seam of sand.

As a result of the information obtained, it was decided to excavate the rock to the seam, replacing it all with concrete. Had it not been removed, there was a chance the dam could have been washed away, causing a major disaster.

On another Hydro-Quebec job, the equipment was used to probe the mystery of a cavern discovered beneath the forebay of the Carillon hydro-electric project. Hundreds of feet of piping had been lowered without success to plumb the depths of the cavern and engineers wanted to know whether any danger existed to the plant.

The TV pictures dispelled fears that water was flowing through the cavern and showed the lost piping piled up against the walls of the cave.

Last year, yet another outside agency called on the Hydro TV crew for help. While building a 13-lane bridge to carry traffic across the Chippawa Power Canal near Niagara Falls, the contractor discovered that rock at the bottom of the footings was badly faulted.

Since Hydro originally built the canal, its engineers were consulted and a decision made to drill several test holes and examine the strata with the camera. Using information obtained from the pictures and core samples from the holes, the contractor was able to modify the foundations for the 680-foot continuous arch structure.

While the number of jobs the borehole camera may be called upon to perform appears to grow yearly, the device has by no means reached the peak of sophistication. Research is now in progress on a camera that can be threaded through the slender ductwork and pipes at Hydro's nuclear power stations.

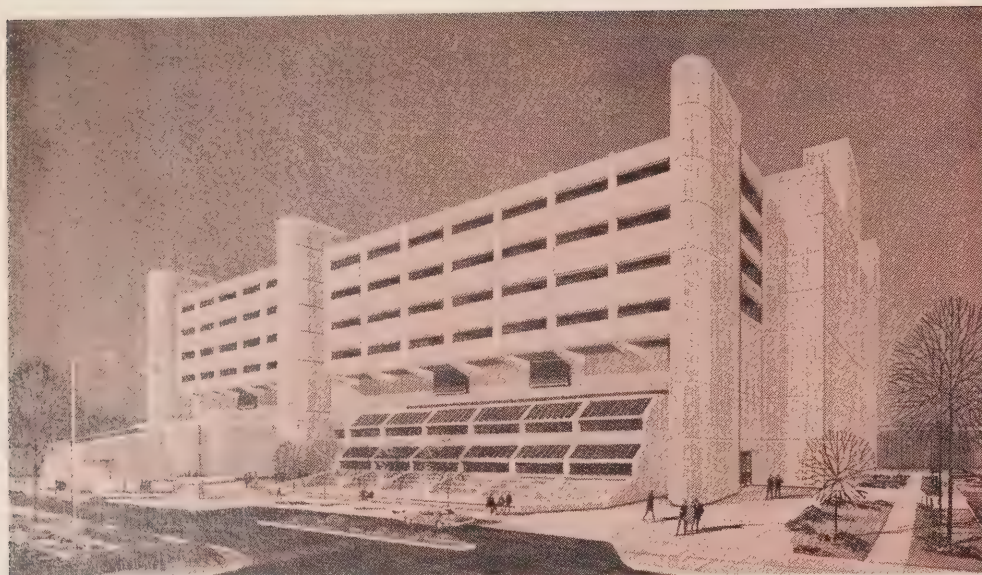
It must be less than an inch in diameter! □

watchdogs of the waterways

With a flotilla of vessels,
the Canada Centre for Inland Waters
looks more like a naval base.
Its mission: to protect
the nation's lakes, rivers
and streams.



The \$23 million Canada Centre for Inland Waters as it will appear when completed in 1972.



A 69c. experiment in a multi-million dollar laboratory may provide important answers to the pollution of Canada's lakes and rivers

The study is being conducted at the Canada Centre for Inland Waters, a \$23 million Canadian government complex now taking shape on the shores of Hamilton Bay near the Burlington Skyway.

At first glance, the development, with its two large research vessels and a flotilla of motor launches, looks more like a naval base. But the staff of more than 250 have one common interest—to study Canada's inland waters with an eye to their preservation.

Anyone walking into the limnogeology section might be surprised to find rows of tomato plants growing under hot-house conditions. It's not that the scientists have suddenly become infatuated with gardening, but rather it's part of an experiment to test the fertility of the lake bottom mud.

Last summer, two staff members, Dr. Anthony Kemp and Alena Mudrochova, decided to plant tomato seeds in mud taken from a number of polluted lakes. The experiment was considered by other staff members to be "just a bit of doodling," but their investment in a few cents' worth of seed and a little time yielded results which have prompted them to embark on a three-year test program.

If the soils prove excellent for agriculture, a market may be developed which could justify the expense of dredging polluted sediment from smaller lakes.

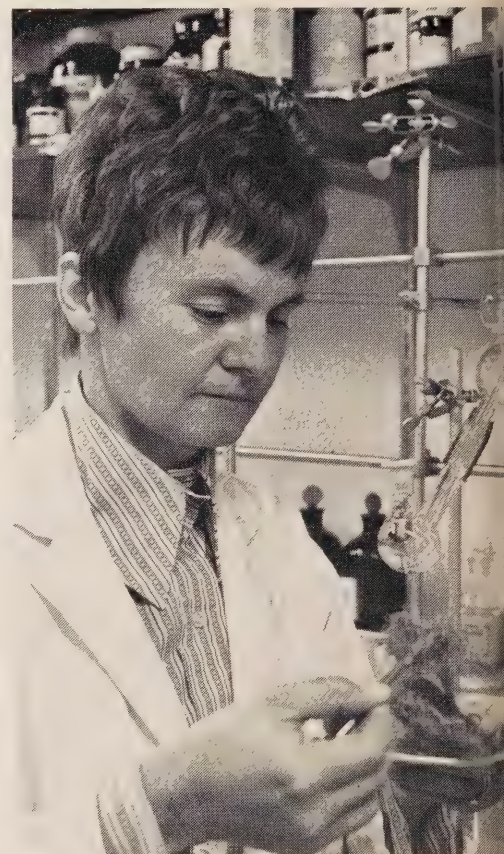
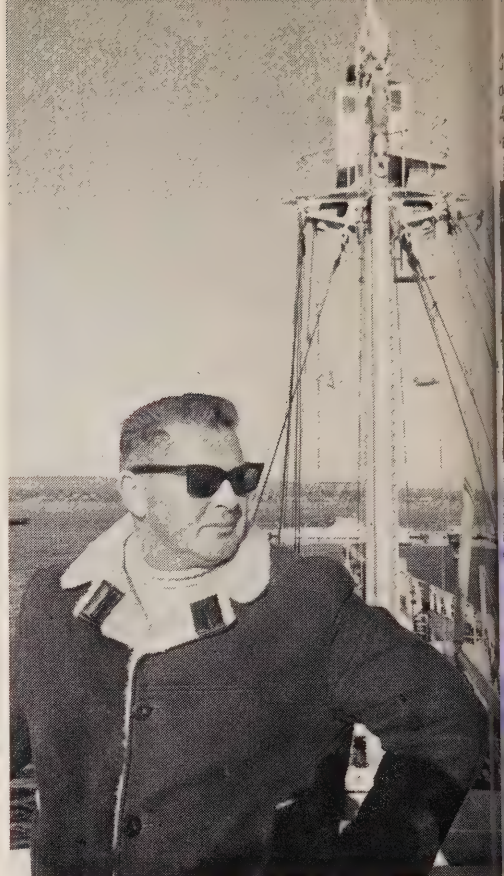
Removal of the nutrient-rich mud would not only eliminate some of the pollutants, but would deepen the lakes and allow more water to enter and dilute the remaining contaminants.

Results so far show that mud from Hamilton Bay and Lake Ontario produced better tomato plants than the best agricultural soil. Further studies will determine the effect on the plants themselves as well as the lasting quality of the nutrients in the soil.

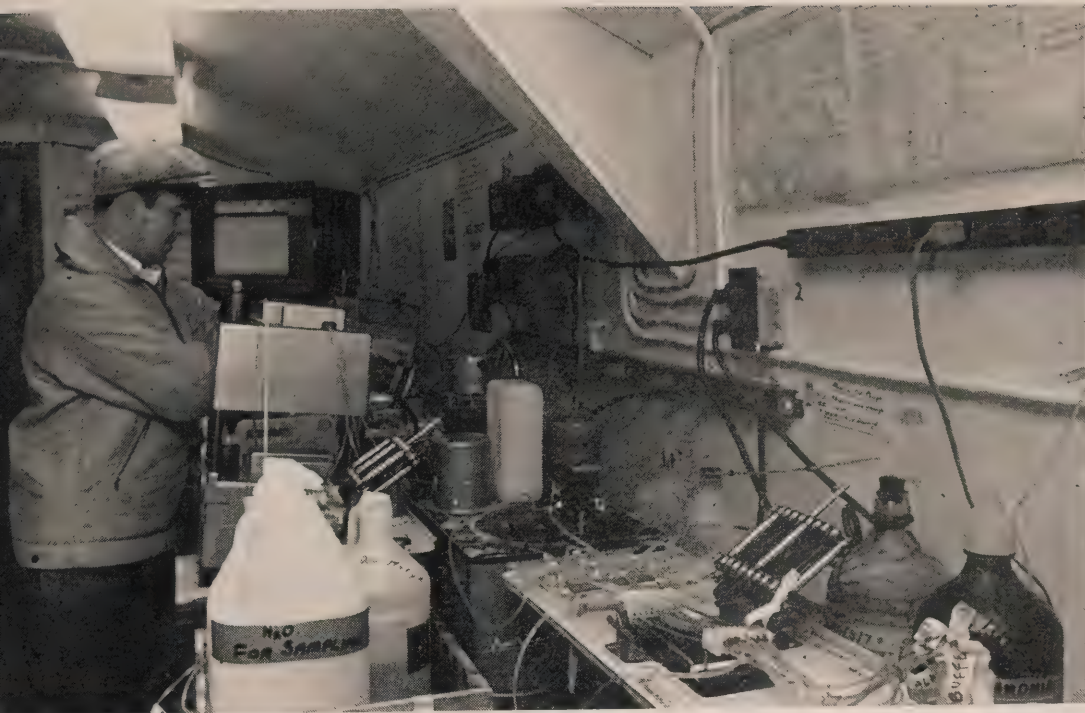
This is only one of several research programs now under way by the centre's Great Lakes Division. Others involve research into physical, chemical, geological and biological processes in the Great Lakes. These are directed toward the solution of problems posed by such factors as pollution and shore erosion.

Studies of prime national concern include sewage treatment methods, oil spill clean-up techniques, industrial wastes and phosphates. In fact, work done by the centre's scientists contributed greatly to the regulation of phosphates and detergents under the Canada Water Act. Studies are now being started to investigate the effect of NTA (sodium nitrolotriacetate), a probable substitute for phosphates in soaps and detergents.

A sewage disposal test plant is being built at the centre and is expected to be operational in June. Research will include the use of radio-isotopes to irradiate sewage before disposal.



Captain C. Maro, of the survey ship, Martin Karlsen, prepares for another mission on the Great Lakes. At right, a marine technologist analyzes the water in one of the ship's laboratories.



Lower left: roots of tomato plants grown in polluted lake bottom mud are analyzed for contaminants. Scientists use sophisticated equipment, like the atomic absorption spectrophotometer (middle) to uncover the secrets of Canada's waterways. At right, a technician examines thermal plume photos taken at Hydro's Lakeview power station as part of a study on waste heat.



Long arch of the Burlington Skyway contrasts sharply with the subdued lines of the Canada Centre for Inland Waters now taking shape on Hamilton Bay.



The centre has been established as the major interdisciplinary water resources research institute in Canada with three federal departments co-operating in its endeavours. These are the Department of Energy, Mines and Resources, the Department of National Health and Welfare and the Department of Fisheries and Forestry although the federal government has now moved to bring these activities under one Department of the Environment.

Another study now under way deals with the discharge of cooling water from power stations along the Great Lakes. A survey conducted for the centre by the H. G. Acres Company indicated that by the year 2000 the annual waste heat discharge into Lake Ontario will be equivalent to five January sunshine days, or enough to heat 12 million Canadian homes for an entire winter.

Thermal-electric stations draw on large quantities of water for cooling purposes. This water is cleansed before entering the plant's condensers and is returned to the lake cleaner but about 15 degrees warmer.

Dr. R. K. Lane, head of the centre's physical limnology section, stresses there is not enough information available yet to determine whether this waste heat will have harmful effects.

"In fact, we are careful to avoid the term thermal pollution in our discussions."

Dr. Lane has already discussed the subject with Ontario Hydro and the Ontario

Water Resources Commission at several meetings. Information on the warm water discharge from the Lakeview power station on Lake Ontario is being supplied by Hydro and will save the scientists several months' work. A report may be ready this spring.

"We were pleased to learn that Hydro was collecting information we could utilize. This will materially help us in preparing our report," Dr. Lane added.

Using an aircraft equipped with infrared scanning devices, Dr. Lane and his group are studying the warm water plumes from both Lakeview and the Douglas Point nuclear station on Lake Huron. They will determine how the plumes change at different temperatures and under different meteorological conditions and will study the flows, circulation, and diffusion of the discharges.

Once the characteristics and effects of these plumes have been evaluated, a further program will be geared toward ways of putting the warm water to use, for example, in fish hatcheries or for recreation.

In addition to using aircraft, the centre has two major floating laboratories — the 147-foot Limnos, flagship of the fleet, and a chartered vessel, the 214-foot Martin Karlsen. There are also several smaller vessels while a naval submarine and a hovercraft have been used. The centre operates a tug boat — the LacErie — primarily for limnogeology studies on the lake bottom mud.

"The mud is like a diary of the lake's history," says A. R. Kirby, the centre's public relations officer. "For example, we can trace back to 1915 the introduction of mercury into manufacturing processes. The beginning and end of the second world war are clearly defined by the fluctuating mercury levels."

He explained that mercury contamination can be pinpointed as it began building up in 1940 when industry around the lake geared itself for the war effort. The mercury levels tapered off after the war.

As her name implies, the Limnos was designed primarily for limnological research — the study of freshwater lakes and streams. She carries a crew of 16 together with 11 scientists and technologists. The Martin Karlsen has a varied history, having once taken explorers to the Antarctic. She was later transformed into a whaling ship for the Alan Ladd movie, "Hell Below Zero."

Both vessels are used year-round and in 1970 averaged about four days a week probing the secrets of the lakes. Information gathered has been utilized by various government departments, organizations and institutions.

As time goes on, the centre will branch into activities relating to lakes and streams across Canada. Staff is being transferred to Burlington from various government agencies and will steadily grow to a maximum of about 1,000 within the decade. □

long hydro nes



Harold A. Smith

board in 1965. The organization's objective is to ensure availability of service to the 12 million customers served by members. □

Power council post

Ontario Hydro's chief engineer, Harold A. Smith, has been named vice-chairman of the Northeast Power Co-ordinating Council, a consortium of the 20 major electrical utilities that provide 98 per cent of the power generated in the Northeastern US and Ontario.

Ontario Hydro is the sole Canadian member of NPCC, formed after widespread outages in Ontario and the US eastern

Lorne R. McDonald, OBE, QC

Ontario Hydro's former general counsel and prominent public servant, Lorne R. McDonald, OBE, QC, has died at the age of 68 years, following a brief illness.

Col. McDonald entered the public service in Ontario in 1946 as assistant to the provincial secretary and later became secretary of the cabinet and deputy minister under former prime minister Leslie Frost.

Col. McDonald joined Ontario Hydro in 1953 and served 12 years as its general counsel until his retirement in 1967. He had a distinguished career in the Canadian Army, serving in the militia with the Essex Scottish Regiment from 1935 until 1939 and overseas from 1940 until after the end of the second world war. He was made an officer of the Order of the British Empire in 1945.

Born in Hamilton, Col. McDonald received his early education in Regina and graduated from Osgoode Hall and was called to the Bar of Ontario in 1927. He was admitted to the Inner Temple, London, England, in 1945 and created a King's Counsel three years later.

From 1927 until 1939 he practised law in Windsor and returned to private practice in Georgetown following his retirement from Ontario Hydro.

He was a member of the Law Society of Upper Canada, the Lawyers' Club of Toronto, the Inner Temple, Royal Canadian Legion, St. Andrews Society of Toronto, Canadian Order of Foresters and Phi Delta Phi.

Col. McDonald is survived by his wife, two daughters, and a son.



Lorne R. McDonald



Ray S. Griffin

New manager

A man with 33 years' Ontario Hydro experience, Ray S. Griffin, has been appointed manager of Georgian Bay Region. He succeeds I. Carl Ingimundson, who retired on December 1 after 20 years' service.

Mr. Griffin has been operations engineer in Niagara Region since 1964. He obtained his electrical engineering degree at the University of Toronto and has held a number of positions, including mechanical maintenance superintendent, in Niagara Region. For eight years before becoming operations engineer, Mr. Griffin was plant superintendent at the Beck generating stations.

Mr. Griffin served with the Canadian Armed Forces during the second world war. He is married with a son and daughter and is a member of the Association of Professional Engineers of Ontario and the Burlington Curling Club. For a number of years he was involved with the Boys' Club of Niagara Falls and is a former member of the Rotary and Optimists' clubs.

Mr. Ingimundson, who was born in Selkirk, Manitoba, has been manager of Georgian Bay Region since 1967. He joined Hydro as executive assistant to the director of the former frequency standardization division. In 1960, he was named executive assistant to the general manager and a year later became manager of the former East Central Region. In 1962, Mr. Ingimundson was appointed manager of Northwestern Region. □

More than a house

The small yellow brick bungalow looks much like any other in Strathroy's newest residential development. In fact, it's the PUC's W. C. Pearson substation, a \$55,000 tribute to the man who served 17 years on Strathroy PUC and was its chairman for 10 of them.

During recent opening ceremonies and a testimonial dinner for Mr. Pearson, tribute was paid to him by Ontario Hydro chairman George Gathercole, Hydro commissioner Dr. J. D. Fleming, OMEA president D. G. Hugill and District 7 president Ross Fewster.

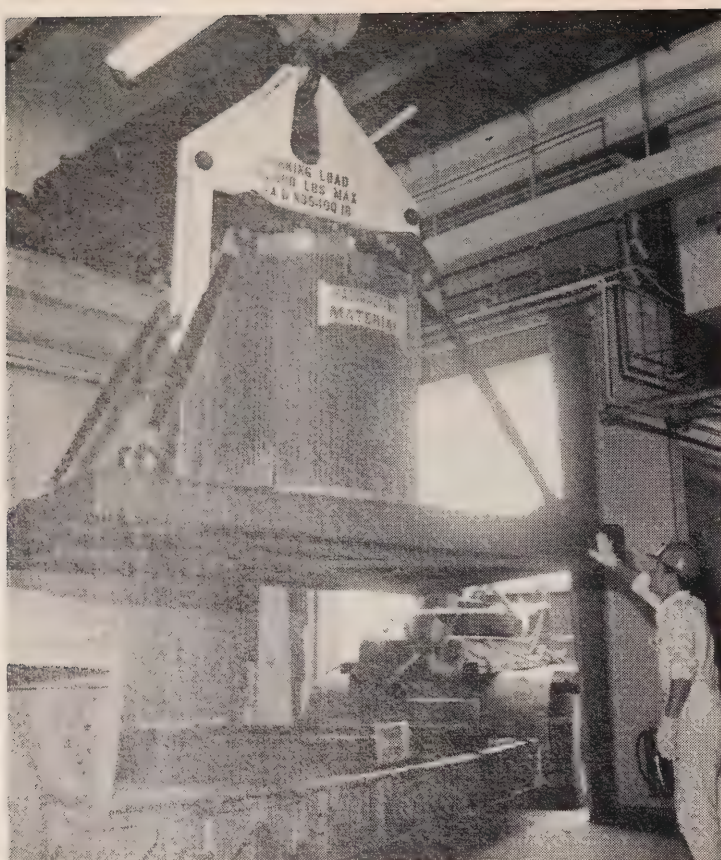
When it came time to cut the ribbon, Mr. Gathercole stepped aside in favor of Mrs. Pearson. Assisting her, below, are Mr. Pearson and PUC chairman Ron Tadgell.



"Be my guest"

Still worth a bundle

Although they've exhausted their usefulness to the Douglas Point nuclear station, a six-ton load of 320 fuel bundles will contribute a great deal to the European nuclear power program. The "spent"



Down gently

fuel has been shipped to Belgium for reprocessing at a European Nuclear Energy Agency plant.

Under a 1968 agreement with Atomic Energy of Canada Limited, the French Commissariat à l'Energie Atomique will buy plutonium extracted from the fuel for use in its experimental power reactors.

During the fission of uranium fuel in a reactor, some of the uranium is changed into plutonium. A residue of this plutonium can be recovered and used as fuel in other reactors. The agreement includes international safeguards, including inspection, to ensure the plutonium is used only for peaceful purposes. □

Rockfall feared

Another massive rockfall—possibly of the same magnitude as the one in 1954 when 185,000 tons of rock broke away from the American Falls—has been predicted by a geologist working with the US Corps of Engineers.

T. A. Wilkinson told the International Joint Commission that the danger area is next to Prospect Point where visitors take elevators down to board the Maid of the Mist ferry on the US side of the Niagara River.

Mr. Wilkinson says the area is "honeycombed" with vertical fractures and has become partly detached from the main rock mass.

Many of the fractures, he says, are hundreds of feet deep and one, about 25 feet back from the crestline, is open and about a foot wide. Other fractures are concentrated in the same area, but still haven't broken through the cap rock and are still contained in the lower rock strata.

The fractures, Mr. Wilkinson says, were discovered through core borings done at 46 locations along the top of the cataract after water was dammed off and rerouted over the Horseshoe Falls. Colored dyes were poured into the boreholes and traced along various seepage routes to the exposed face of the American Falls.

Members of the IJC have been studying erosion at the American Falls since early 1969. An expanded geological study, it was learned, would cost about \$5 million and could take several years to complete.

Assistant director

Philip R. Stratton, former construction manager at Ontario Hydro's Bruce generating station, has returned to the employ of Hydro after a 15-month absence and has been named assistant director of supply-services in the Supply Division.

Mr. Stratton's appointment coincided with a reorganization of the division which saw the Etobicoke service centre split into three departments under his direction—transportation and work equipment, service centre facilities and supply control.

Assistant director of supply Harold E. Kennedy has been named assistant director of supply-procurement. He will be responsible for the acquisition of equipment for Hydro's billion-dollar expansion program, procurement of fuels, general products, electrical products, mechanical and structural materials. In addition he will co-ordinate the division's quality assurance program.

Another significant change in the reorganization program is the appointment of a representative in the UK to improve administration of major contracts let for Hydro purchases there.



Philip R. Stratton



Percy R. Locke

A familiar name

When the voters of St. Thomas went to the polls to elect a new Public Utilities Commission last month, a familiar name was missing from the ballot sheet.

Percy R. Locke, a PUC member for 33 years, decided not to seek re-election in order to devote more time to other interests.

First elected in 1937, Mr. Locke served a commission chairman 10 times and during his tenure has seen some of the most significant advances in the history of electric energy and water supply in St. Thomas.

The number of Hydro customers, for instance, has nearly doubled in that time to 8,830. And back in 1937, the kilowatt-hour consumption for the year was about 22,000,000. Now it's in excess of 152,000,000.

Over the years, Percy Locke's contribution wasn't just limited to St. Thomas PUC. For three years he served as OMEA District 7 president and in 1962 he was elected provincial president. He served on the president's council for five years after his term at the helm and has sat on most of the provincial association's committees at one time or another.

For Percy Locke, commissioner, retirement will be filled with nostalgia—because each one of his 33 years of public service holds a special memory for him.

Ash lagoon

Ontario Water Resources Commission approval has been received for Ontario Hydro's \$8.3 million waste treatment system slated for the Nanticoke generating station, under construction on the Lake Erie shoreline eight miles east of Port Dover.

The 185-acre lagoon will receive ash sluiced from the coal

plant's boilers and waste water from the water treatment system. Clarified water will be recirculated from the lagoon back to the station to be reused in the ash-sludging process. □



... the king's horses ...

Winter wonderland

Humpty Dumpty sat on a wall. Humpty Dumpty had a great fall ...

So it goes in Mother Goose and so it goes in Simcoe, too. For Humpty Dumpty did indeed have a great fall in this town of 10,000 population's Wellington-Clifton parks area where he was part of a Christmas panoramic display which attracts thousands of sophisticated city-dwellers from points as far away as Toronto, Windsor and Buffalo every December.

For the past dozen years, traffic jams have been the rule rather than the exception in the twin parks area where last year over 75,000 cars passed a check-point and their occupants viewed the more than 40 displays, ranging from Santa and his reindeer to a miniature church that holds a congregation of 12. The panorama is provided by local businessmen and service organizations through the Chamber of Commerce. Simcoe PUC plays a lead role in the show. There are 200 Christmas trees in the parks area and all are lighted. There are 200 more spotlights in the area and it takes a half mile of wire to service the parks with 10 miles of extension cords to feed power to the decorative lighting. The PUC supplies the power while the parks department completes the hook-ups.



... did put Humpty ...

"We spend about \$1,500 each year just replacing lights," says parks board chairman Cliff Post. He adds that some are lost through vandalism, but most are cracked by wind.

And wind's the story of Humpty Dumpty, newest display in the panorama. He wasn't up but a couple of days when a wind storm blew him off his perch and hurt him considerably.

But all the parks department's "horse-power" and all the parks department's men were able to put Humpty Dumpty together again. □

Friendliness is ...

When it comes to telling the people, Streetsville PUC is really taking the initiative. In a recent issue of the weekly newspaper, the PUC ran an advertisement spelling out one of the duties of its line crews.

Headed "What kind of man rescues cats in distress?" the ad pointed out that rescuing pussycats from tall hydro poles isn't a job the commission trains its linemen to do, but it's a task they handle surprisingly often, with remarkable agility.

The message continues: "Their real service to the community lies in their skill in working with the lines and transformers that carry electricity to your home, office or business. Day or night, in all kinds of weather, our line maintenance staff are on the job to ensure that you always have a constant supply of low-cost electrical power.

"However, take one anxious parent, a tearful youngster and one distressed pussycat huddled on the crossarm, and our linemen do the neighborly thing ... happily reuniting purring puss and smiling owner." □

Water treatment

Three Ontario Hydro contracts worth a total of about \$2¼ million have been awarded for part of the water-handling equipment at the oil-fired Lennox generating station at Bath, 22 miles west of Kingston.

Graver Water Conditioning Division of Procor Limited, Oakville, will provide the fully-automated water treatment equipment for the closed steam-water cycle system at a cost of just under a million dollars.

Noranda Copper Mills Limited, of Rexdale, will supply about 50,000 tubes for the steam condensing system. Cost is just over \$1 million.

The third contract, worth about \$250,000, went to Pleuger of Canada Limited, Mississauga, for tempering water pumps. These will draw cold water from the station's forebay to be mixed with the warmer outflow from the condensers. This lowers the temperature of cooling water before it's returned to the lake. □

From Picton to Peking

In spite of its relatively small circulation of 14,000, Ontario Hydro News reaches across the world from science libraries in Peking and the Ukraine to the offices of Britain's giant Central Electricity Generating Board and the manager of a small utility in Chile. In all, the magazine goes to 34 foreign countries.

Of course, most of the copies are distributed in Ontario where, according to a recent readership survey, each one is read by an average of 3.66 persons. The survey went to people in industry, the municipal utilities, the municipal, provincial and federal governments, the news media, schools, financial organizations and public libraries. Ontario Hydro employees and pensioners were excluded because their opinions were sought in an earlier internal survey.

Readers were polled in an attempt to determine whether the magazine is doing its job in communicating Hydro policy and progress and emphasizing the versatility of electricity to a highly-diversified audience with varying interests. Most of those who replied said they have no other regular sources of information about Hydro policy and almost half of them rated the magazine as only one step away from "excellent" on a five-point scale.

Most groups of readers classified pollution and science as the two most interesting topics. Readers in the municipal utilities category rated conferences of the OMEA and AMEU and the Municipal Briefs feature as "very interesting."

Ecological backlash

The Aswan Dam on the River Nile is universally considered a resounding success for its production of electric power, but many of its social and economic benefits are being undermined by a savage and unpredicted ecological backlash.

Biggest change caused by the dam has been the creation of Lake Nasser, which stretches for 4,500 square kilometers where there was once little but desert. The lake, which is still filling up, has suddenly become the breeding ground for bilharzia, a parasitic snail dangerous to humans.

Attempts have been made to wipe out the snails with chemicals, but with little success. Once established in the lake, they'll be almost impossible to eradicate.

And the working of the dam itself has been threatened by the phenomenal growth of a familiar pest quaintly named the water hyacinth by a well-meaning missionary. The weed floats in patches miles wide and hopes for a fertile inland fishery or lucrative tourist attraction are all but destroyed.

But the most visible ecological upset has occurred many miles from the dam itself in the fishing grounds of the Nile Delta. Five years ago, there was an annual catch of 18,000 tons of sardines. Today, the industry is bankrupt and hundreds of fishermen are unemployed. □

Fast breeder

The UK's Central Electricity Generating Board could conceivably start construction on its first full-scale fast breeder reactor by 1974, says Sir John Hill, chairman of the Atomic Energy Authority.

He told a press conference that nearly £27 million of a £59.2 million expenditure during the year on civil research and development was for fast reactor systems.

The fast breeder reactor is likely to be the dominant type installed in Britain in the 1980s. The 250,000-kilowatt prototype being built at Dounreay is now expected to be operational in 1972. Fast reactors with a 1,250,000-kilowatt capacity are on the drawing boards. □

Canadian Detroit?

An internationally recognized urban expert has called for an immediate beginning on the groundwork for a 21st century Detroit region, which could include a spillover of the US automotive capital into Lambton, Kent and Essex counties.

Dr. Constantinos Doxiadis, of Athens, Greece, said the results of a five-year study commissioned by the Detroit Edison Company have indicated the development of a new city of 150,000 people just south of Sarnia, and another new city of 200,000 south of Windsor.

However, the largest influence is expected from the creation of a super city south of Port Huron. A twin of Detroit, the city would have a population of 1.3 million by the year 2000 and would be joined across the St. Clair River to Canada by a high-speed train system running through London, Toronto and Montreal.

Sarnia could increase its population to 275,000 from its present 60,000, while Chatham should increase from 32,000 to about 85,000 and Windsor from 200,000 to 700,000. □

Space technology

Six small hydro-electric generating stations in the Bracebridge area will be remotely controlled this year from Ontario Hydro's Muskoka transformer station.

To bring about the change, Hydro has adopted space technology and is using integrated circuits to send and receive

information up to 30 miles between the control centre and the unattended stations.

Integrated circuits are tiny pieces of silicone that can each contain more than 50 separate components such as diodes, capacitors, resistors and their interconnections.

Ontario Hydro began its remote control operations with cumbersome electric relays, later switching to solid state circuits developed from the transistor and, finally, to the integrated circuit.

Apart from their size, the speed with which they operate, the amount of information that can be transmitted and the meagre power that they use make integrated circuits ideal for the job. □

No waiting

Detroit Edison should have no trouble in getting coal delivered to its new Monore thermal-electric station — the utility has become the first to own its own locomotives.

Not only has the company ordered the cars for transporting coal from northern West Virginia, but also the motive power for pulling them. Involved are 588 aluminum gondola cars and 22 diesel-electric locomotives.

The system will transport eight million tons of coal a year to the plant. Detroit Edison officials say it is a vital part of the 3,000,000-kilowatt station. □

municipal briefs

Saturday isn't usually a working day for the Meaford PUC staff but they turned out in force last month to help brighten the festive season for the townsfolk. In co-operation with the local fire department, PUC staffers inspected Christmas lights for anyone who wished to have them checked for safety — and local merchants provided a 10 per cent discount to encourage replacement of unsafe sets. It was good business all around.

Kingston PUC, in co-operation with the city's Board of Works and Bell Canada, has formed a technical committee to co-ordinate the installation of essential services. PUC manager J. K. Fee says the group will co-ordinate the installation of service equipment and will also aid in the locating of PUC and Bell cables, sewer and water mains and public works projects. Similar committees exist in Toronto, Ottawa and other major centres.

Appointments made in a Scarborough PUC engineering department reorganization recently announced by general manager T. J. Curtis include: K. H. Anthony, chief engineer; A. M. E. Durnford, director of operations; Joseph Korchinski, substation and planning engineer; Andrew Tilt, waterworks engineer; George Young, distribution engineer, and A. C. Lawrence, consumer service engineer.

Etobicoke Hydro's \$613,000 Judson service centre was officially opened by the former heads of the three municipalities which have amalgamated into the borough of Etobicoke. Assisting commission chairman John P. MacBeth with the ribbon-cutting ceremonies were Hugh Griggs, Mimico, Donald Russell, New Toronto, and Tom Berry, Long Branch. The service centre is located in the Meadows Industrial Park.

Niagara Falls Hydro's former lines superintendent, C. Kenneth Pearson, has died at the age of 69. Mr. Pearson retired in 1967 after 45 years' service and was a commissioner for a year following his retirement. □



Don wright sees it

Way back last October we had some aside remarks to make in these columns relative to English humor and the British-ers' over-developed concern for the health, happiness and mental well-being of creatures such as the earwig and the great auk. During the course of our dissertation we lampooned one fellow's distress over the plight of the lowly (as opposed to upright or tall) earthworm. We thought he had things out of perspective in demanding that "all games on grass" be cancelled because he once saw a beautiful earthworm killed by a rugby player's boot."

As it turns out, he may have been right. Any event, we have received a letter and some fascinating background material from a Port Rowan lady which suggest that the noble and ancient worm family (its history goes back 750 million years) has a lot going for it.

Well-known for its ability to aerate and enrich the soil, the earthworm, we are informed, has the rudiments of a brain and can be educated. Furthermore, once he digs a thing, he never forgets.

Some worms are smarter than others and an authority of renown from the University of Michigan has discovered that dull worms can be fed better educated worms and thereby acquire most of the smarter (but less fortunate) worms' knowledge through cannibalism.

Logically, the professor will now try to determine whether or not the same process applies to higher forms of life such as humans, and while we wish him luck we would hesitate to join him for dinner. Not that he's likely to choose us as the main course if he hopes to reach a loftier intellectual level through his diet.

Even without an education, our correspondent points out, the earthworm can do a number of things you and I would be hard-pressed to emulate. For one thing, it is the highest animal to retain the ability to regenerate its part if severed.

Cut a worm into several parts, she tells us, and within two weeks each severed section fully develops all the vital parts it needs including a head, eyes, mouth "and a remarkable variety of sexual parts."

This brings us to another interesting facet of the earthworm's physiology which is far beyond human versatility at this point in time. Each adult worm has both male and female organs with which it can reproduce without any of the complications normally involved in choosing a mate.

In other words, an earthworm can have a helluva good time all by itself and then go its separate ways.

■ Each day brings word of new successes on the scientific front, but failures seldom make the headlines. A recent item from New Jersey proves the exception. Man has been unable to devise a machine able to out-perform his own nose as a smelling device. Speaking at an odor pollution conference, a Massachusetts chemist reports that "the human nose as a detector is still at least 1,000 times more sensitive than any machine detector so far devised."

And that little gem could just put us on the track of a quarter of a million dollars. The British Columbia government is reportedly offering this tidy little sum to anyone who comes up with an effective and economical method of eliminating pulp-mill odors. So far, no one has been successful and we suspect this is because their efforts have been misdirected. They've been concentrating on the mills rather than the nose. Now if we can just find a way, short of germ warfare, to de-activate the old sniffer we'll have it made.

In actual fact, the human proboscis is far too sensitive to cope with the environment as it is developing today and it's time some thought was given to improving the adaptability of the species through selective breeding. The time may be at hand when only people with bad colds or other olfactory problems should be allowed to make babies.

■ Yesterday, we greeted the news that pantyhose were now available for men with a loud and bawdy guffaw. Today, there's been a 30-degree drop in temperature and we're having second thoughts. Manly disdain is all very well and perseverance is a great virtue, but when the wind howls in its usual demoniacal manner down University Avenue and the air is cold enough to freeze the ears off a glass donkey the old male ego is likely to sag a bit at the knees.

Let's look at the thing logically. Outdoors on a cold day a suit of long johns can be a comfort and a joy. In a warm office they are not only superfluous but a

dermatological disaster and a threat to the mental equilibrium of the wearer.

What is now being offered for men is not a direct steal from the ladies. Their no-exit gossamer garments would be quite unacceptable to the average self-respecting male, even with the reinforced crotch. The new men's unmentionables seem to represent a sensible compromise between the hairy and the fairy – a lightweight creation extending downward from the navel and encasing the 10-odd cold-susceptible digits en route. From the shin on down, they resemble regular socks thus eliminating a second serious male problem – how to keep the hose at high mast without the need for supplementary supporting paraphernalia.

All in all, we predict a big market for masculine pantyhose – providing a suitable name can be found. Something like "rogue toasters" or "don jons" might do.

Etobicoke received a stiff jolt as the new year lurched off the launching pad. The acknowledged leader in the field of controversial by-laws, this Metro municipality has in the past introduced legislation ranging from the level of water in borough bathtubs to the optimum number of bedrooms in local birdhouses. Fancy its chagrin, then, at being swept aside so early in the year by those sodbusters in Moose Jaw who captured countrywide headlines with a sensible little amendment to a traffic by-law encouraging people to walk on the right-hand side of sidewalks.

The by-law is intended to avoid collisions between pedestrians and, strictly adhered to, it should provide a safe buffer zone between persons strolling in opposite directions on the same sidewalk. Lane changers would be liable to a maximum fine of \$100 or 30 days in the hoose-gow.

Insignificant as the by-law may sound, it opens up a whole new field of municipal revenue and lends itself to future refinements running the whole gamut of traffic control. Nuisance offences, for example, might be expected to include improper turns, failure to come to a complete halt at intersections – and tailgating. Many a toe rubber has been lost due to this latter form of irresponsibility.

The magistrate would be expected, of course, to take a more serious view of those charged with refusing to yield the right-of-way, reckless walking and walking with the ability impaired. Female pedestrians would have to be watched very closely for noisy mufflers and for unnecessary use of the horn.

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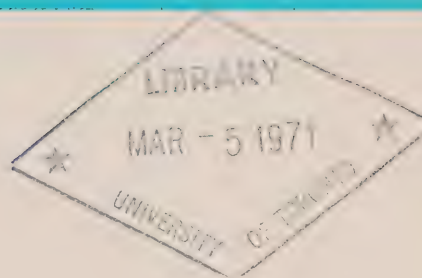
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building blocks of tomorrow



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the cover

Stacked boxes of Habitat are, perhaps, the most famous form of systems building, although other methods and their suitability for the electrical industry were discussed at the conference of the Ontario Electrical League in Toronto this month. An article on systems building appears on page 12.

editorial board

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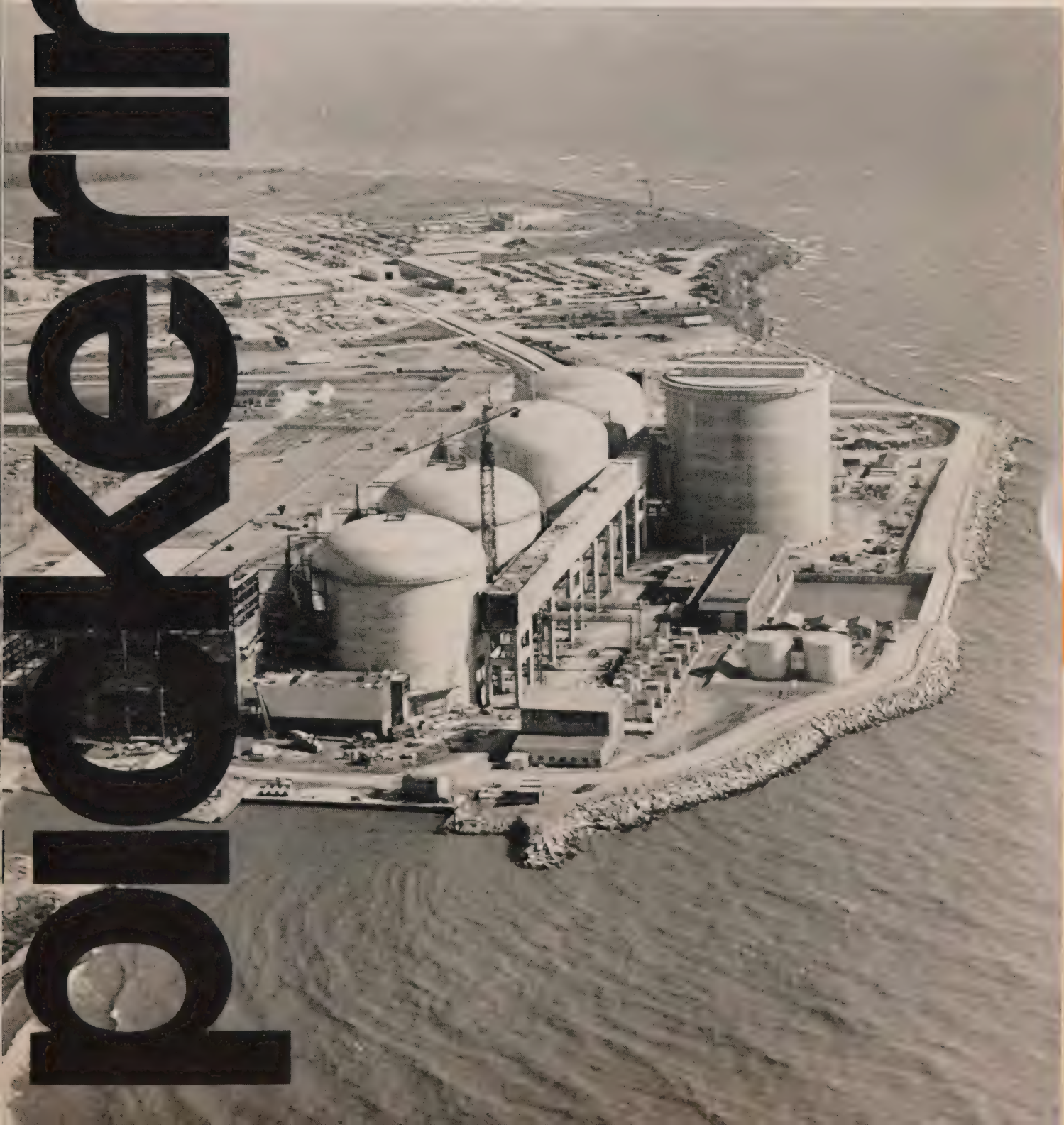
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The first of 4,680 uranium fuel bundles is shown about to be inserted into the No. 1 reactor at Pickering power station, just east of Toronto. Reactor start is imminent and the station will deliver first power later this year. More about Pickering appears on following pages.

Before

countdown to first power



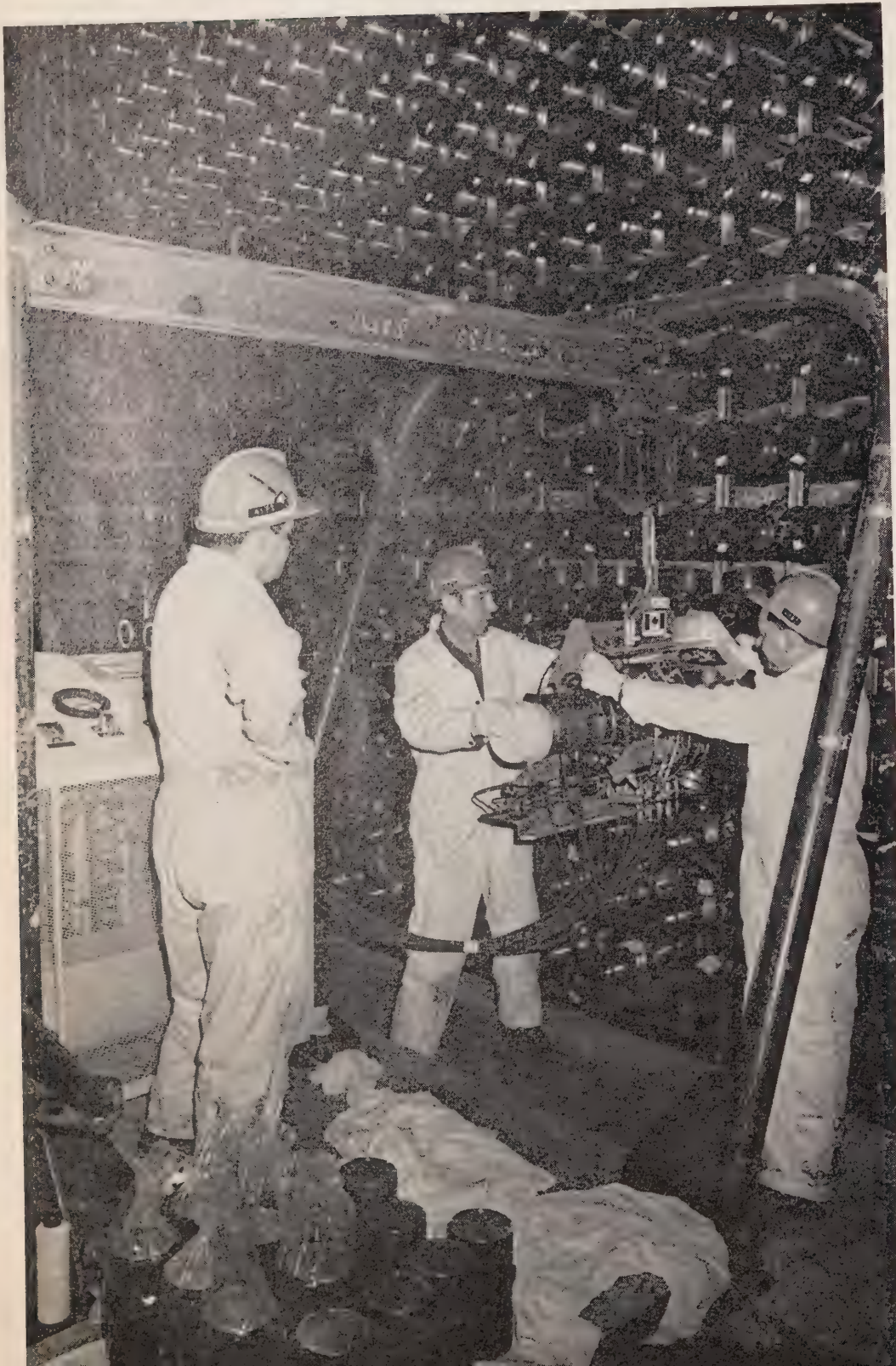
International experts will be watching with interest when Pickering generating station begins to produce power from the atom sometime in the next few months.

One of the largest nuclear stations in the world, Pickering is steadily nearing completion on the shore of Lake Ontario, east of Toronto. Its natural uranium, heavy water reactor design is uniquely Canadian and the eyes of the world's nuclear community will be trained on the complicated commissioning procedure and the inevitable teething problems that will arise.

Three years from now, when all its generating units are in operation, Pickering will produce sufficient energy for 1.7 million homes. It will mark a major advance in efforts to produce electricity from the atom at costs competitive with, or less than, those of fossil-fuelled plants.

It was back in 1965 that construction crews first broke ground for the plant. The peak building period, more than 10,000 workers were on the payroll.

Pickering, designed by Atomic Energy of Canada Limited, is the largest nuclear generating station in the world.



Ends of the fuel channels are sealed on Pickering's No. 1 reactor. Right: work continues on the No. 3 reactor end shield.

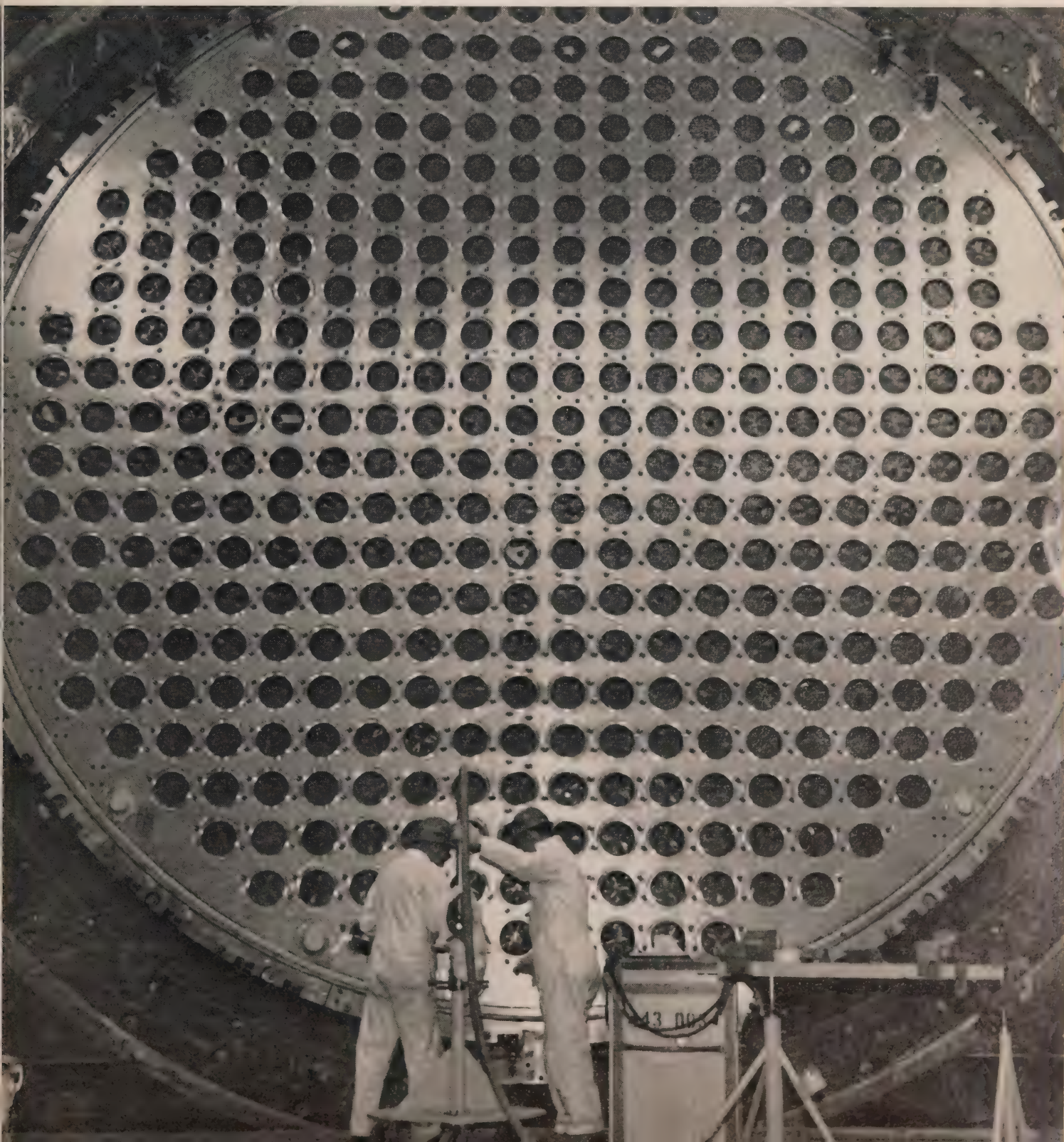
a Limited and Ontario Hydro, is the nuclear station built, owned and operated by a Canadian utility. The plant's two 540,000-kilowatt units are being financed by Ontario Hydro and the federal and provincial governments. But the utility will pay back the government contributions with interest and bear the entire cost of the two remaining units. Total cost of the plant is established around three-quarters of a billion dollars.

Construction is behind schedule, mainly because of a prolonged construction strike

in 1967 and late deliveries of equipment. But there have been some intriguing aspects to the building of the big plant.

There was, for example, the 159-foot-high wall for the vacuum building that went up in a non-stop slip-forming operation in 7½ days. It involved the placing of 9,320 yards of reinforced concrete by a 150-man workforce split into two 12-hour shifts. They achieved an average climb of 11 inches an hour — two more than originally estimated.

Pickering is Ontario's third nuclear plant based on the CANDU reactor which is fuelled with natural uranium and moderated and cooled by heavy water. Nuclear Power Demonstration (NPD), a 20,000-kilowatt pilot plant on the Ottawa River near Rolphton, has operated successfully since 1962. It was followed by Douglas Point station, located on Lake Huron midway between Port Elgin and Kincardine, which started up in January, 1967, and is feeding 200,000 kilowatts into the Ontario Hydro grid.



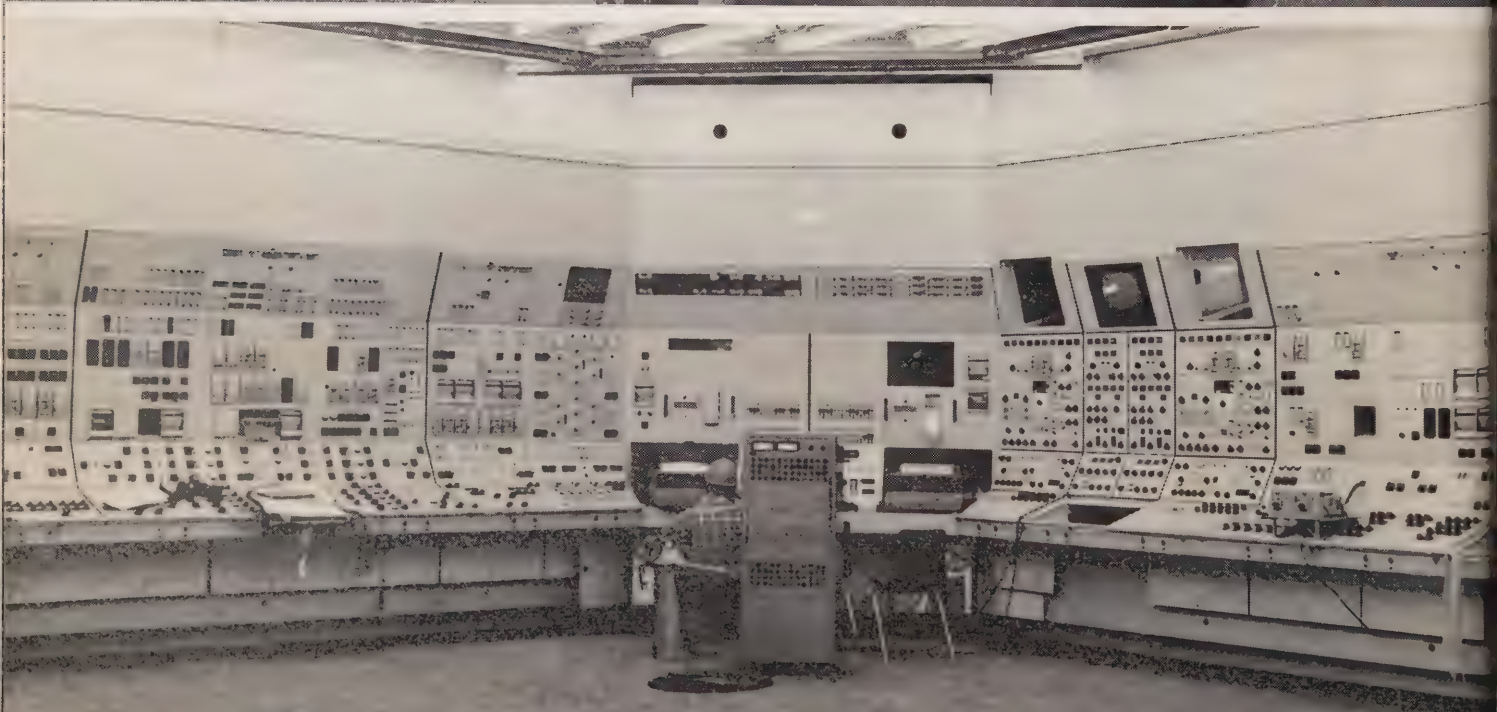
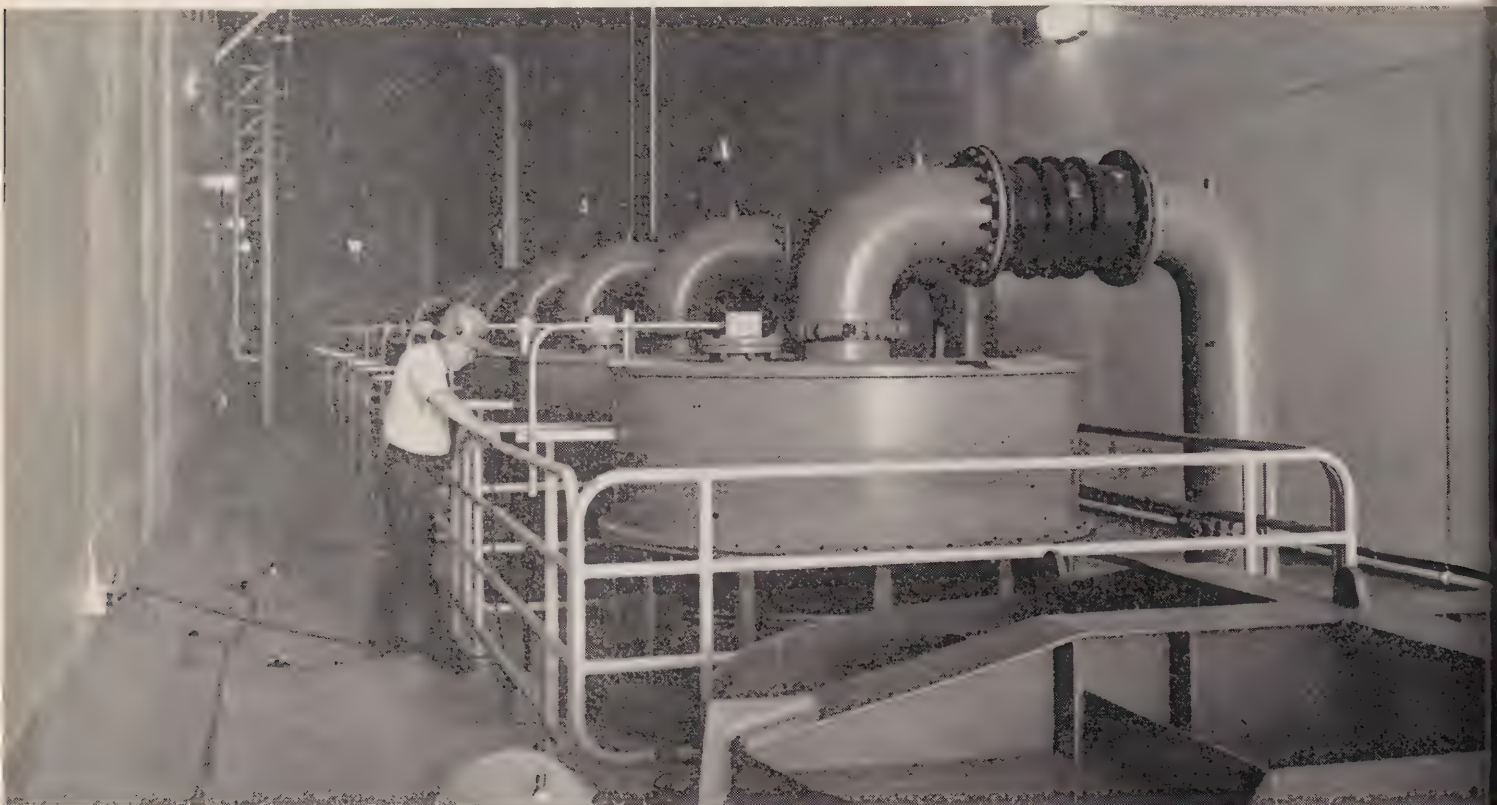
The 540,000-kilowatt units being installed at Pickering represent a giant step forward in the quest to produce electric power from nuclear energy at prices competitive with other fuels. With the economies made possible by large units, it's expected that nuclear stations will be competitive as base-load plants, supplying power continuously to meet demands.

In 1945, just as the curtain rang down on the Second World War, Canada's first experimental reactor produced about as much heat as a light bulb. Now, as a step

beyond Pickering, Ontario Hydro will move up to reactors powering 800,000-kilowatt units at the Bruce generating station, under construction next to the Douglas Point plant.

Pickering has already opened up opportunities for many companies and thousands of Canadians in the nuclear power field. Indeed, its performance in the next few months will be watched as closely at home as it will abroad. □

Part of one of Pickering's safety systems, the huge valves will open automatically should pressure build up in one of the reactor buildings. Other photos show a section of the control room and work in progress on the fourth reactor building.





When electricity begins to flow from Pickering nuclear power station later this year, the first of the plant's reactors will also be manufacturing an intriguing and highly utilitarian by-product.

cobalt

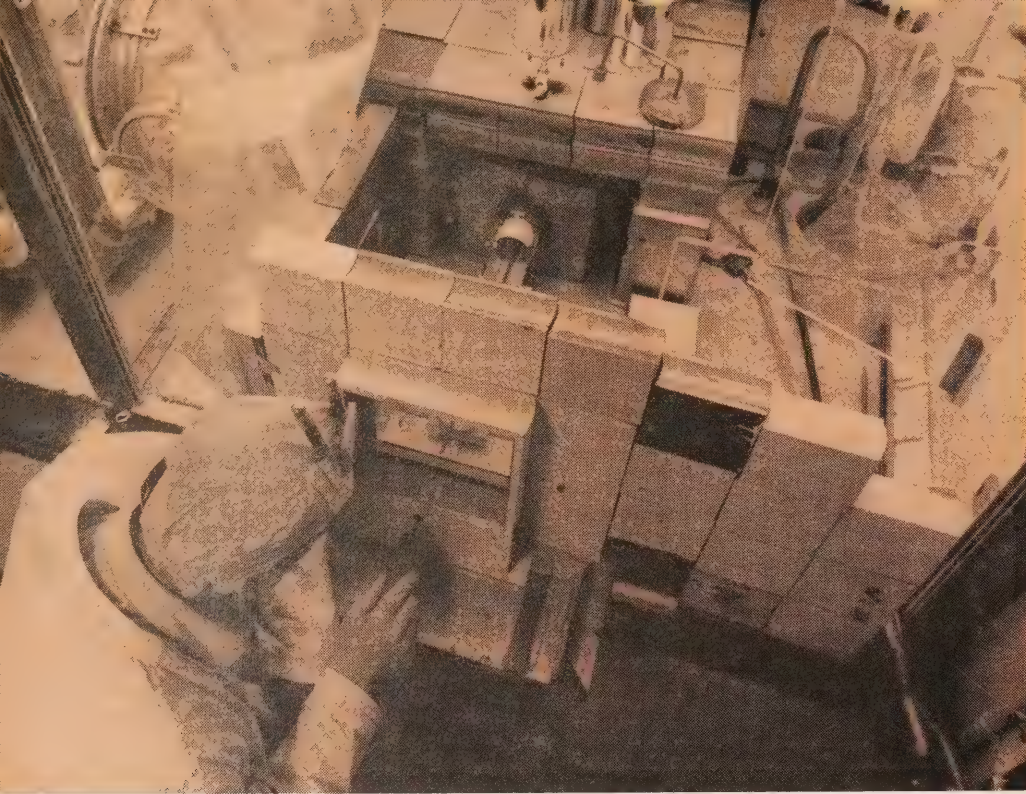
60

:the now

It will sterilize bandages and hypodermic syringes, detect faults in pipe welds and machinery and, perhaps, even keep navigation lights flashing in the Arctic night. It has been used since 1951 to treat cancer and shows promise in prolonging the life of food and in creating new wood, textile and concrete products.



cotope



Canada has done a great deal of pioneer work in the production and application of radioisotopes of all kinds. Here an isotope less powerful than cobalt-60 is literally canned for shipment.

The substance is cobalt-60, described by R. F. Errington, vice-president of Atomic Energy of Canada Limited's commercial products division, as "the most important radioisotope in terms of the number of curies of it in use and, indeed, in its potential for the future."

One curie is equivalent in strength to a gram of radium. AECL has sold more than 11 million curies of cobalt-60 in 20 years. By 1975, Pickering's four reactors are expected to be exceeding that amount in a single year.

AECL will supply the cobalt bundles and cover all the costs of producing the isotope. Sometime next year, when the fission process has produced sufficient activity per gram, AECL will transport the radioactive cobalt to its Ottawa plant in 25-ton lead-and-steel containers.

A reactor produces cobalt-60 when an atom of cobalt-59, the common isotope, captures a neutron given off by uranium fission. The radioisotope emits strong gamma rays, similar to X-rays, capable of penetrating several inches of steel or concrete. Its half-life of 5.3 years compares with isotopes which have to be replaced within a few days or even hours.

These properties make cobalt-60 a valuable tool to preserve and stimulate life processes, to inhibit harmful organisms and to change the molecular structure of many substances.

Apart from their commercial value once they have undergone irradiation, the slim

pencils of cobalt also play a vital role in the actual operation of the reactor. Bundled together, they form the adjuster rods whose function is related to their ability to absorb neutrons. Removal of the rods supplies the additional neutrons required temporarily for start-up. They also help control the shape of the neutron flux or flow to obtain maximum power output.

Canada has done a great deal of pioneer work in the production and application of radioisotopes. AECL developed and produced the world's first cobalt-60 unit for treating cancer. Improvements quickly followed and there are now more than 850 AECL units in 59 countries. In addition, the world's first commercial research irradiators came into being with AECL's family of Gammacell and Gammabeam units.

AECL will continue to produce cobalt with a radioactivity of about 200 curies a gram, suitable for cancer therapy, in its NRX and NRU reactors at Chalk River. Cobalt-60 produced at Pickering will have a specific activity of 50 to 100 curies a gram, suitable for many commercial purposes.

"Every indication points to greater application and increasing demand for cobalt-60," says an AECL spokesman.

Pickering cobalt will be used to replenish and build up existing radioactive sources for commercial applications (now as large as 1.5 million curies) and to meet new uses. Aside from cancer therapy, the current major use is sterilization of bandages,

cotton swabs, syringes, blood transfusion kits and disposable medical supplies. 28 irradiators are used in various field research in Canadian educational institutions.

Industrial radiography to detect faulty pipe welds and machinery has become a routine procedure. Hydro has used a cobalt-60 source to check thick pipe welds (up to six inches) in Lakeview and Lambton generating stations. However, handier portable cameras containing active iridium-192 are being used extensively on welds up to two inches thick for quality control on the Pickering project.

AECL is working in co-operation with several firms to develop wood parquet flooring, soil-resistant carpets and corrosion-resistant pipe. Gamma radiation alters the molecular structure of material and sometimes produces superior products. For example, wood flooring now being marketed is wear-resistant, easy to clean and has a permanent finish which doesn't require waxing or varnishing. Nylon fabric can be made permanently waterproof.

Food preservation by irradiation is a revolutionary technique which could be used to increase world food supplies. Gamma rays inhibit sprouting in vegetables, delay the ripening of fruits, control insect infestations in cereals and dried foods and destroy micro-organisms in fish, poultry and other foods.

On the other hand, minute exposure to gamma rays stimulates growth, provides higher yields and builds in immunity to certain plant diseases in a number of foodstuffs.

Gamma irradiation leaves no radioactive residue on food or other materials — more than a TB chest X-ray, for example, because the energy is spent in the product. Commercial acceptance of such products, however, lags behind scientific knowledge and assurance of safety.

But commercial applications are growing and are expected to require large irradiators each containing 1,500,000 curies or more of cobalt-60. In preparation, the commercial products division is building additional isotope handling and storage facilities near Ottawa.

The growing market is indicated by the division's revenues, which amounted to \$11.2 million in 1969-70, a nine per cent increase over the previous year. Ninety per cent of the business came from abroad. In fact, cobalt-60 from Pickering has been shipped up in Australia, Chile, Spain, Poland, Ceylon or scores of other countries and served by a blend of Canadian foresight and ingenuity. □

grey owl

... enigma of the north

For the first time, a book goes inside the life of this elusive, mysterious bird of prey. In a series of chapters, the author, a leading expert on the owl, tells us how he has spent his life studying the owl, and how he has discovered its secrets. The book is a masterpiece of nature writing, and a must-read for anyone who loves the owl.





Angele, Grey Owl's first wife, was left destitute. It was Angele who first taught the renegade Englishman Indian ways.

The tall pines in Finlayson Park cast long shadows. Set deep among them overlooking the grey-blue water of Lake Temagami is a plaque to a man who was a legend in his time, and in this era of ecological awareness a man ahead of his time.

Grey Owl was both mysterious Indian lover of the wilderness and a renegade Englishman, sometimes known as Archie Belaney. It was Grey Owl who tamed the beaver, and in poetic yet virile prose made the city aware of the vanishing glory of the virgin forest. It was Grey Owl who broke the hearts of Indian maidens across the North country. It was Archie Belaney, the great conman, scallywag supreme, who fooled the British Royal family.

The controversy over Grey Owl will never die, and as time progresses there is an increasing appreciation of what he was, and what he was trying to do. But as Grey Owl grows in stature, his books reissued and his memory refurbished by the kindly light of time, in the little village of Temagami, where Archie Belaney first became an Indian, there is another memory preserved by the Indian people.

The Temagami Indians adopted Grey Owl, and gave him his name. They saw him desert them, taking with him what he had learned, and leaving little behind but a legend and a plaque.

While white men, burdened by a sense of guilt as wildlife disappears and the Indian struggles to adjust to modern society, take another look at Grey Owl, the Indian

people remember his wife, Angele, the girl who made Grey Owl an Indian.

It was Angele who taught him woodcraft, who taught him to speak the Ojibwa tongue, who made his first buckskins. It was Angele who showed him how to make cooking utensils out of bark, to make simple medicines from herbs, how to track down the deer and moose, and set traps for the beaver. It was by these means that Angele kept herself and Belaney's child from starving when he left her for a series of common-law wives.

Was he heartless, or just a restless spirit that couldn't stand to be tied? His daughter, Agnes, has one last memory of her father: when he borrowed her week's wages, all of \$15, to buy a train ticket. But the man who deserted his wife and child could tame a beaver, or write of the agony of the animal caught in a steel trap, or charm high society with his simple good manners and vibrant personality.

Grey Owl's father, George Belaney, was born in Hastings, on the south coast of England, son of a well-to-do family. George, it seems, was a handy man with the bottle and a gay blade with the girls. In the tradition of the times, he was sent to make his way as best he could in the United States.

In 1885, he married a young lady called Kitty Morris. Whether there was any Indian blood in Kitty isn't known, although in later years her son was to claim she was an Apache, Catherine Cochise.

George and Kitty returned to England shortly before the birth of their son. George was not looked upon with much favor by his relatives, and he and Kitty lived in poor surroundings. Her son was christened Archibald Stansfeld Belaney and in those early years Kitty told him countless stories of life on the plains, of the Indians, of the buffalo bones still bleaching where the vast herds had roamed, and of a life much more free and romantic than drab and Victorian Hastings could offer.

Poor Kitty wasn't to enjoy her son for long, for her husband's two sisters took a liking to the boy and took charge of him without, as far as can be determined, making any allowance for Kitty's feelings.

Archie was enrolled in Hastings grammar school, where he was a clever student. He was a keen musician and at an early age displayed the skill with pen and pencil that would later help him to illustrate his own writings.

But respectability had little attraction for Archie Belaney, and in 1905, when he was only 17, he set out for Canada. For a time he worked in a Toronto store. Then, like so many adventurers of the time, he heard of

the silver boom at Cobalt, 300 miles to the north, and along with bootlegger stock promoters and some honest men he boarded the train.

No record can be found of him in the camp, but it doesn't seem likely that working underground by the light of flickering candles would have much attraction for a lad who claimed Apache blood in his veins.

Just 25 miles south of Cobalt, around Temagami, there were sparkling lakes and deep forests that Archie Belaney must have dreamed about as he played in the shrubbery of his aunt's prim home. It was in Temagami that Archie Belaney, Angele Egwuna, a young and beautiful Indian girl.

He married Angele, and in those early years they were happy. The Ojibwa people welcomed the white man to their hearts and named him Wa-Sha-Quon-Asin, which means He Who Walks by Night, or Grey Owl.

In "Men of the Last Frontier," Belaney wrote:

"A blood brother proved and sworn in by a moose head feast, wordless chant and an ancient ritual, was I named before a decorated and attentive concourse with Ne-ganik-abo, Man That Stands Ahead of whom none living remembered as a young man, danced the conjurer's dance, beneath the spruce trees, by an open fire, danced the ancient steps to the throb of drum, the wailing of reed pipes, the rhythmic stirring of turtle shell rattles: danced before a sacred bear skull, set beneath a painted rawhide shield, whose bizarre device might have graced the tomb of long dead Pharaoh."

That Belaney was adopted into an Indian tribe has been accepted by most authors and it is generally assumed that it was Temagami. That Temagami's Indians are enthusiastic about the memory of their distinguished adopted son is best explained by 75-year-old Charles Potts, an Indian who knew Angele and Belaney well.

"He was never adopted by the tribe," states flatly. And Mr. Potts derides Belaney's colorful description of the ceremony.

But blood brother or not, it wasn't long before Grey Owl tired of Angele and set out north to the little village of Biscotasing. He had inherited his father's love of drinking, but was much in demand as a pianist, playing the ivories in his buckskin suit, with long dark braids down his back.

It was here that Grey Owl met a French Canadian girl, Marie Girard, second in a line of romances. But then the First World War broke out, and his English blood called him to the trenches where his Indian blood served him in good stead as a sniper.



Grey Owl with Annahareo in the Prince of Wales National Park.

as wounded and gassed and while spring in Hastings married Constance, who soon divorced him. Belaney fled to Bischoff, where he celebrated with such enthusiasm that it wasn't before the police were looking for him with a warrant for his arrest.

perhaps, was the crucial moment when the white man in Belaney submerged, to escape the white man's justice he became the complete Indian, Grey Owl.

He journeyed back to Temagami, intending to go to new and rich trapping grounds in Quebec. But he stopped at Camp Kook and worked as a guide for a while. This was around 1925, and his daughter, Agnes — now Mrs. R. Lalonde — was working as a waitress in nearby Temagami. But Belaney's charm had not faded, and soon he took up with a girl named Bernard, a Mohawk girl from Temagami who was working at the camp. To get her out of town, he borrowed a car and wages from his daughter. She never saw him again.

Grey Owl renamed Gertrude "Annahareo," and it was she who shared the harrowing story of the supposedly rich trapping grounds in northern Quebec, where they were being destroyed by poachers and nearly starved during the long winter. The trip is vividly described in Grey Owl's book, *Men of the Wild*.

During this long winter that Grey Owl, the hunter, became Grey Owl, the conservationist. He made pets of two tiny

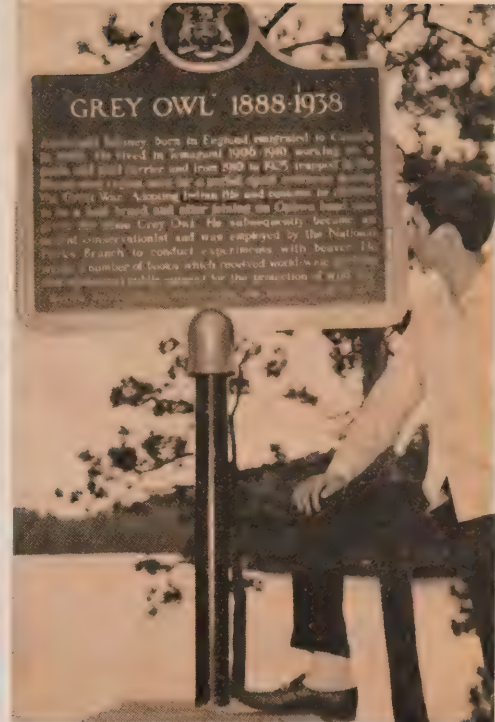
beavers that were too young to kill. Later, he caught Jelly Roll, a lovable female beaver, which became an almost human character in his first book. And then he captured Rawhide, another beaver which refused to leave and stayed many years until Grey Owl's death.

Grey Owl had given up trapping and had Annahareo and a houseful of beavers to support. So he tried his hand at writing. To his surprise, his first article was accepted by an English publication, and soon he wrote "Men of the Last Frontier," the first of many books.

Fame and fortune came quickly to Grey Owl. A movie was made of his work with the beavers, and the federal government made him a warden at the Prince Albert National Park in Saskatchewan.

Grey Owl became famous as a lecturer and was invited to England where he met the Royal family. It seems that his distinguished hosts accepted him as a colorful native of the Canadian wilds rather than a former resident of Hastings. While on the way to Britain, in Montreal, he and Annahareo parted and he met Silver Moon, also known as Silver Dawn, a French-Canadian girl.

Books continued to pour from his pen, including "Pilgrims of the Wild," "Adventures of Sajo and her Beaver People," "Tales of an Empty Cabin," and "The Tree." But a rough and full life, the strain of the lecture tour, all had sapped his strength and Grey Owl died from pneumonia on April 13, 1938. He was buried near the shore of



Dory Lalonde, great-grandson of Grey Owl, stands beside the plaque erected in Temagami's Finlayson Park in memory of the writer and conservationist.

Lake Ajawaan, far from Temagami and Angele, who in 1940 married William Turner and enjoyed a few years of modest happiness until her death in 1955.

For years, Grey Owl was hardly mentioned in Temagami. But about 10 years ago, a plaque was erected to his memory in Finlayson Park. The most frequent visitor is 15-year-old Dory Lalonde, Grey Owl's great-grandson.

"I go there every day," says Dory, who nurses no hard feelings about his ancestor and plans to be a forester. "He liked girls, and he liked the outdoors, and I guess I'm just a bit like him," he says.

But at night, when the wind whistles through the pines and small animals scurry through the bush, some say the ghost of Grey Owl still stalks the Temagami forests. If you listen to the water splashing against the rocks, you can hear the distant slap of Jelly Roll's tail on the water and perhaps the sobs of an Indian girl, crying for the white man who loved and left her.

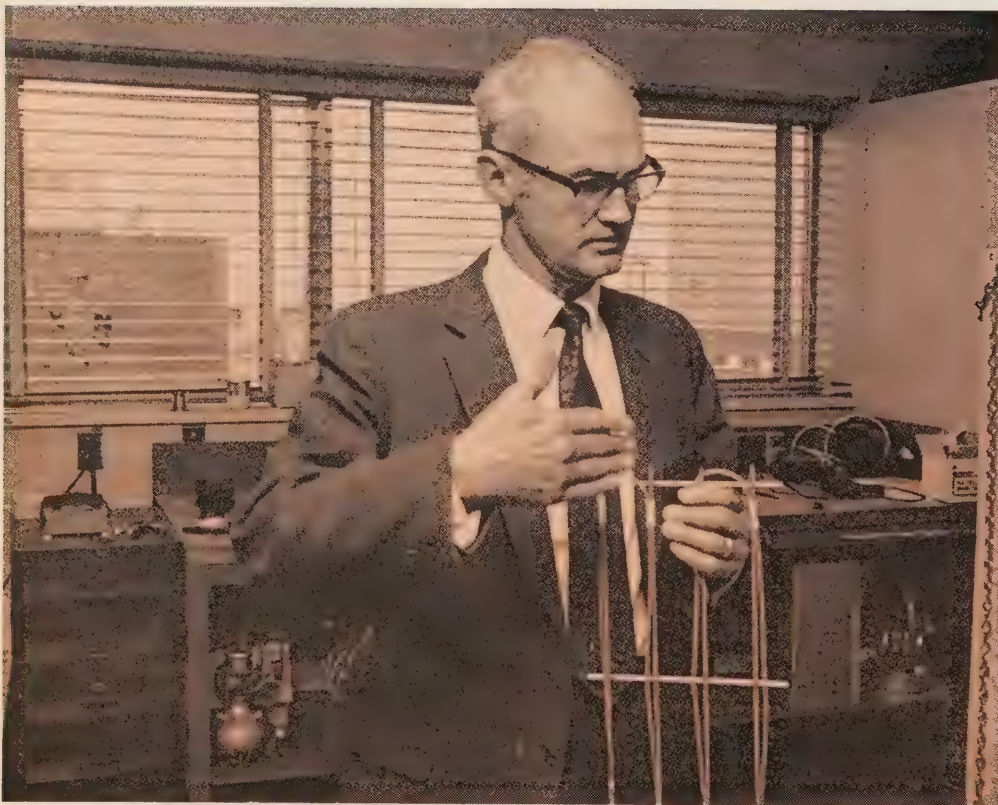
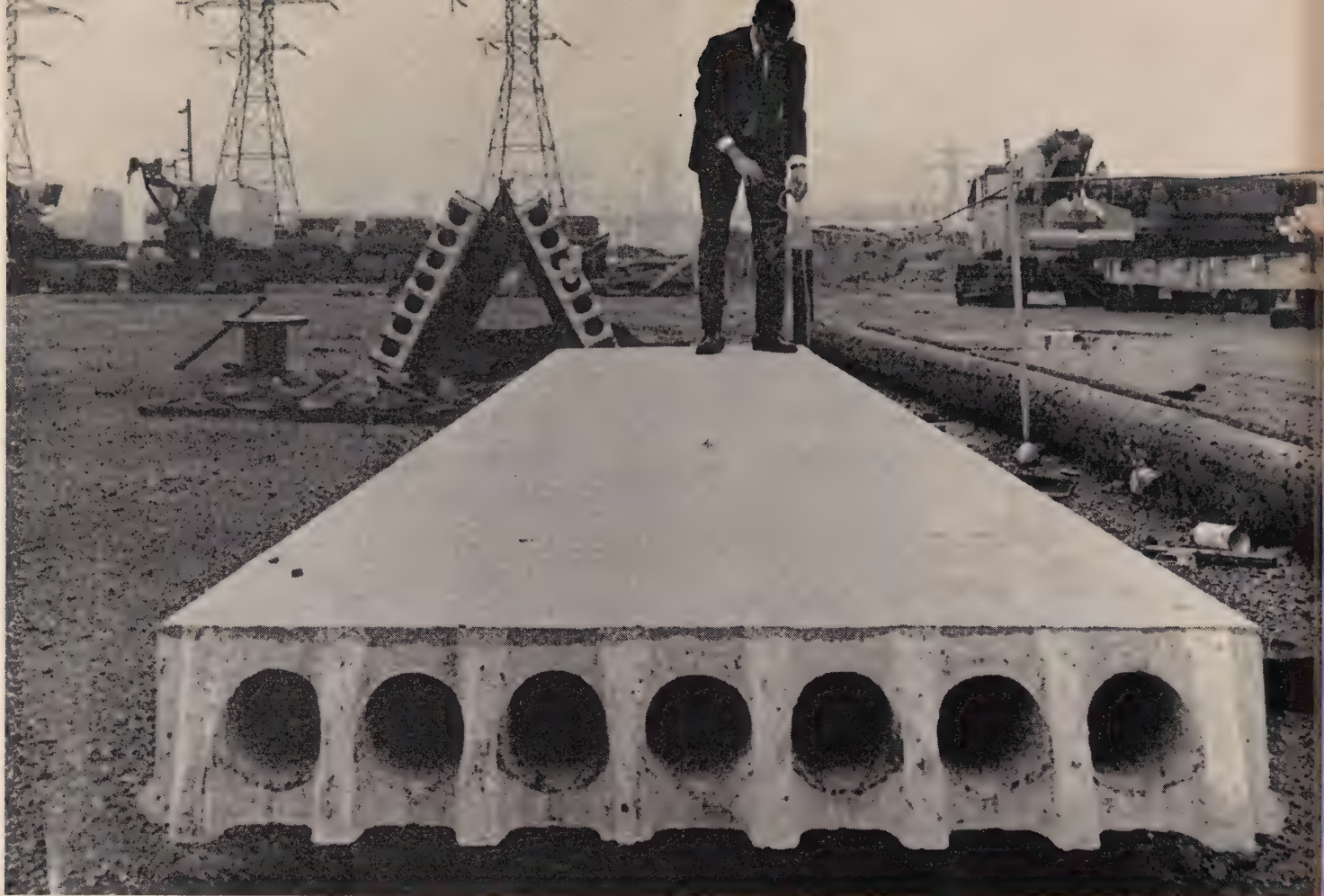
Literary genius or immoral rogue, Grey Owl left a legacy of awareness for the wilderness that today is bearing fruit. He is perhaps unique in that most of the wrong he did is forgotten, and the good he accomplished in his lifetime has lived after him. But Temagami's Indian people still shrug their shoulders at the mention of his name. For them, Angele Egwuna's name should be honored on the plaque.

How can Ontario's construction industry gear itself to providing more than one million dwelling units by the end of the decade? Systems building may well provide the answer.

building blocks of tomorrow

By Lois L





Harold West holds a small section of heating element similar to that in the mat cast in full-scale Jespersen-Kay slab (top photo). Such slabs are used in panel systems building Right: a good example of box systems building is the 240-room motel shown under construction at the Dufferin-401 intersection in Toronto.

Since homo sapiens first crept into the cave to escape the elements, the preoccupation of finding dry, comfortable shelter has been one of the human race's main concerns.

Man today has come a long way from the cave-man scene and he wants all the comforts modern technology can offer. But finding suitable housing in North America has become extremely difficult, mainly due to the high cost of the detached single-family dwelling.



Canada, as well as in the United States, a number of factors have combined to put the cost of housing beyond the reach of many low and even middle income families. The first reason is the high cost of money and land in the cities. The second is the high cost of materials. Construction and labor costs are also important considerations, too.

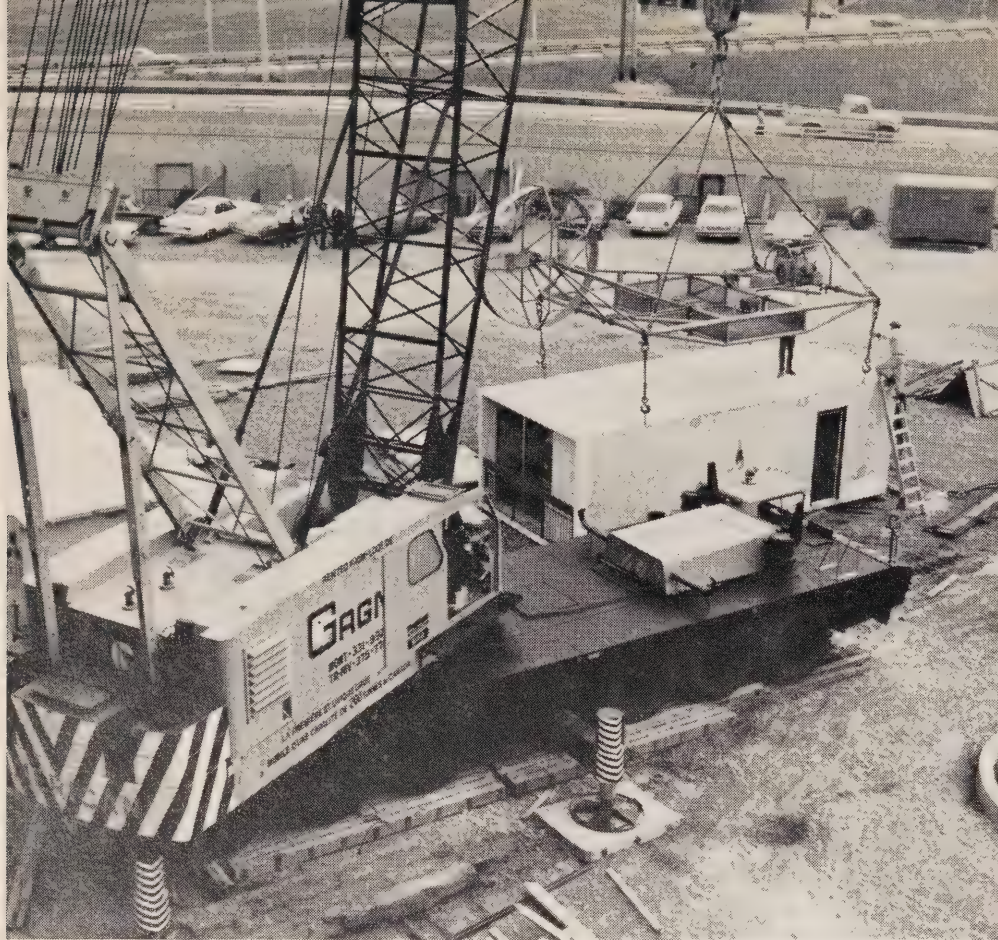
There is also a lack of skilled labor. In the United States, according to one estimate, an additional one million construction workers will be needed in the next decade.

In Ontario, the challenge of building more than one million dwelling units by 1980 has been thrown to the builders. This estimate is based on the province's population projections, plus a forecast by the Economic Council of Canada. It's expected that nearly 62 per cent of the action will take place in the Toronto region.

Thus the market is wide-open for a variety of new construction techniques. One such contender is the concept of systems building, a scheme whereby anything from

slabs and framework to entire dwelling units can be manufactured in the factory and assembled, like an erector set, on the site.

Systems building was conceived in Europe after the Second World War to provide speedy shelter for millions of homeless refugees without having to depend on large numbers of skilled workmen. Conventional building materials were scarce and many countries had lost a great proportion of their labor force during the war.



Complete with balcony, another motel unit is prepared for hoisting into place.

Three main types of systems building — box, frame and panel — are practised in Canada. The best known is probably Habitat, the stacked box apartment designed for Expo. This type is almost exclusively built in the factory and some units even leave the plant fully furnished. One of the best examples of box systems building in the Toronto area is the 240-room Holiday Inn recently assembled in 24 working days at the Dufferin-401 highway intersection.

Frame systems provide flexibility in interior design and are ideal for schools. All columns, beams and girders are standardized and are used with concrete panels for the walls, floors and roof.

But the most popular type appears to be the panel system employing huge wall and floor concrete slabs which are assembled on-site and are highly suitable for apartment construction.

In the panel systems concept, the slabs are cast in concrete in the factory, and all components added before shipping. In

this way, most of the skilled labor is kept in the factory and on-site work is reduced to a minimum. Some builders claim this type of construction can cut erection time by a third.

Since systems building is being accepted as a logical contender in the construction business, Ontario Hydro is trying to ensure that electric heating has as much success in this field as it does in conventionally-built apartments. In Toronto alone, 54 per cent of new apartment suites are electrically-heated and Hydro's director of sales, D. A. Ramsay, wanted to ensure that this lead was not lost.

Harold West, of Hydro's research division, has been investigating electric heating applications for systems building for more than a year. "We had four requirements," says Mr. West. "The system had to be compatible with procedures used by the major builders, it had to be incorporated into the pre-cast slabs at the casting stage, it had to use available heating components and

be competitive with other forms of electric heating."

The final choice was a variation of the radiant ceiling cable consisting of a pre-fabricated heating element that could be installed in a floor slab in less than five minutes and could withstand the physical shock of being covered in liquid concrete.

The research team looked into a number of thermal, mechanical and structural problems, working closely with Modular Precast Concrete Structures Limited of Canada and its UK counterpart, Wates of Britain, both of which cast their slabs vertically. The use of horizontally cast panels was investigated with Jespersen-Kay Systems Limited, of Toronto, and the Jespersen-Kay Company of Denmark.

"In the thermal experiments, small concrete slabs with cable planted at various spacings and depths were tested," says Mr. West. "The experiments showed that cable spaced two inches apart on a mat and embedded one-quarter of an inch in the slab would radiate sufficient heat without damaging the concrete or attracting dirt, which would eliminate having to clean the ceiling regularly."

Structurally, they found that, at present, all panels should be heated to avoid cracking at the joints.

Studies on the mechanical aspects took several months. Various cables on different types of matting were tested in a mold that could be cast both vertically and horizontally. Part of the experiment included placing a television camera right in the mold to watch the effects of heavy concrete on the cable.

The final choice of component was a heavy PVC-insulated electric heating cable fastened to a steel wire mesh.

A dozen mats were sent to England for factory-testing and last spring the Jespersen-Kay plant in Toronto ran full factory trials with the units. According to Mr. West, both experiments were successful. The next step will be to test the ceiling cable mats in six apartment suites this spring.

Great interest is being shown in the Ontario Hydro experiments because most systems built apartments in Britain and Europe are heated by more traditional means.

Another indication of growing interest in systems building is a report prepared by Dr. Peter Bernard for the Ontario Housing Corporation. If OHC, third largest developer of housing in the North American continent, does become involved in the systems approach, it will be awarding contracts for high-rise apartments — an area where this type of construction is most effective in cutting costs. □



portrait of a working man

By Rae Hopkins

He's also
Canada's foremost
milk
producer

His is the uniform of a working man . . . dark green coveralls and a battered hunter's cap that's usually pushed slightly back of his high forehead. Steel-toed safety boots with leather laces and a heavy plaid shirt with the collar partially rolled up complete the ensemble.

Only rarely does Canada's foremost milk producer wear a shirt and tie or business suit. For R. Aubrey Livingston is no "gentleman farmer," although his Broadway Farms Limited employs six "hired hands," has an average summertime production of 10,800 pounds of milk a day and incorporates every modern electrical convenience.

With a herd of "something over 500 head of cattle," more than 200 of which are milking Holsteins, and 1,300 acres under cultivation, Broadway Farms, on a windy plain between Brampton and Snelgrove, has much in common with a fair-sized industrial establishment. And that's exactly what it is.

There's nothing really fancy about Aubrey Livingston's farm. In fact, it looks quite ordinary with the big red brick house set well in from the main road, scattered low buildings complemented by a trio of tall silos and a pair of gasoline pumps at the back.

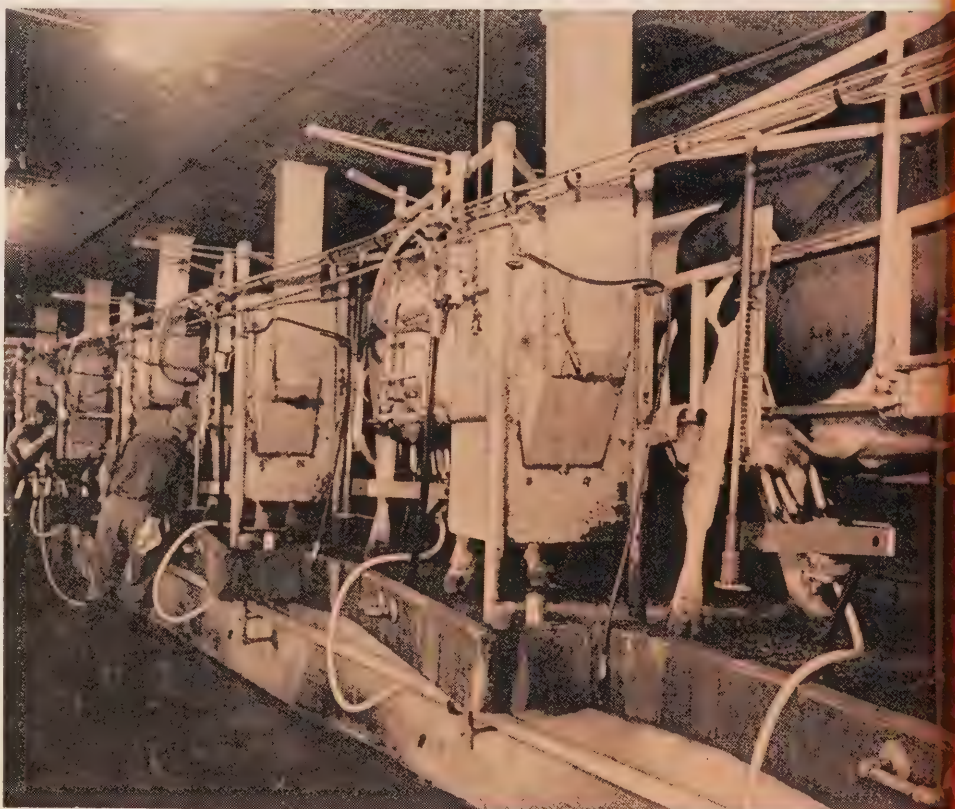
But that's where the similarity ends. The Livingstons' farm is a production unit. It's a family business to produce milk — and lots of it. Cows aren't put to pasture, but instead are billeted in a loose housing arrangement reminiscent of the Western Canada corral. And the only time they're ever indoors is when they enter the all-electric milking parlor with its hospital-clean and sophisticated milking, pumping, storage and refrigeration system.

Actually, the farm consumes about 214,000 kilowatt-hours of electricity a year — enough to supply 27 average homes.

The Livingstons operate about 1,500 acres in all and, says Aubrey's wife, Anne, who doubles as company treasurer, it's all working land. They grow all their own feed, grind it electrically, store it in the silos and ration it to the herd through an auger feeder in the corral. And there's always a little cash cropping — hay, corn, alfalfa and barley — and some custom combining to fall back on in the event of lean years in the milk business.

Anne, a "city girl who never milked a cow until 18 years ago," can quote production figures "down to the last drop" on every cow in the herd. She points out that most are registered cattle, "with a few grade head."

And, she says, the cows average about 14,000 pounds of milk a year each for six or seven years. That's about 6,000 pounds better than the provincial average. All the output of Broadway Farms is sold through the Milk Marketing Board. However, says its treasurer, two days' production each week is channelled through the board to the kosher market. A rabbi oversees the milking on Tuesdays and Wednesdays and



Except at milking time, the dairy herd at Broadway Farms is billeted outdoors.

the entire production is shipped to Toronto where it's processed to meet the needs of the Jewish community.

Broadway Farms has come a long way since that day back in 1952 when it was started by the Livingstons with seven Holsteins and very little else save for a great

deal of ambition and a dream for the future.

And that ambition's still there as Aubrey Livingston leans hard into the raw east wind and calls back over his shoulder, "lunch'll have to wait. One of the tractors is broken down and I have to get the man out of the field — it's time for his meal."



At the District 4 meeting, Consumers' Gas president Oakah L. MacBeth, second from left, is made welcome by incoming president Edwin Steer and Ontario Hydro chairman George Gathercole.



New District 4 executive includes, back row, M. J. Damp, secretary-treasurer; Edwin Steer, past president; J. P. Dunn, R. R. Horkins; R. K. Walker and H. D. Hamilton. Front row: J. L. Christie, first vice-president; Ontario Hydro chairman George Gathercole, honorary president; J. P. MacBeth, president, and M. W. Broley, second vice-president.

Earlier notice of rate increases

OMEA will be asked to petition Ontario to inform utilities earlier of planned rises in interim rates.

Oakville PUC resolution calling for notification by Ontario Hydro of rate increases in power costs was given overwhelming approval at the District 4 meeting in Toronto last month.

Sponsors called for the measure to require municipal utilities to process applications for new rates for implementation on January 1. R. R. Wells, of Oakville, told delegates that the PUC has lost money by failing to bill customers at the previous rates.

Another resolution calling for the provincial association to request Ontario Hydro ensure that copies of communications dealing with interim rate increases be made available to municipal utility chairmen before being released to the press was also approved.

At the address, Ontario Hydro chairman George Gathercole had told delegates that he and the OMEA must develop a new system of informing commissioners of rate increases. He said he believed if the two worked together in a spirit of cooperation, they could devise better methods of getting this information to commissioners at an earlier date.

Of seven resolutions submitted and

approved, Oakville PUC initiated five. One was sponsored by the District 4 executive — asking for an increase in its membership fees — and the other by East York Hydro, which asked Ontario Hydro to devise a new way of comparing costs and other utility statistics.

East York Hydro chairman J. L. Christie said that most family units being built in urban municipalities are in apartments or multiple family dwellings with bulk metering, and current comparisons are no longer properly represented on a per customer basis.

He asked that a more suitable base for cost and statistical comparisons be found.

Oakville PUC was supported in its call for the provincial association to get assurance from Ontario Hydro of a cessation, in 1975, of a \$3 per kilowatt surcharge incorporated into the cost of power for the retirement of frequency standardization conversion debt.

And Oakville PUC's chairman A. Green ushered through resolutions asking the executive committee to consider increasing the number of District 4 meetings each year, saying that his commission considers a district meeting the only effective mechanism for getting together with other area commissioners for an exchange of ideas.

Mr. Green also asked that a joint meeting with District 4 AMEU be considered and called for the establishment of a committee to promote interest and increased attendance at District 4 meetings.

Mr. Green said copies of all agenda items

and resolutions should be circulated to commissions before district meetings to give them time to decide upon their course of action. □

Inflation still a threat

Inflation is still by far the biggest factor in the rise in Ontario Hydro's costs, says Hydro chairman George Gathercole.

While it's true there's been some slackening in the advance of the wholesale and consumer price indexes, this is likely to prove only temporary and misleading, he told District 4 OMEA delegates.

"Unfortunately," he added, "cost-push inflation continues to be rife. Although there's been some improvement, money's still available only at high interest rates which become locked into our costs for many years. Construction wages and other costs have soared and are certain to go higher.

"Rate increases, I'm sorry to say, are a fact of life that we'll have to live with for some years," Mr. Gathercole said.

He added that the necessity of employing new technology in the generation and transmission of electric energy and the adoption of measures in response to environmental concerns would, in any event, account for a rise in power rates.

"But," he said, "there can be no effective relief from inflationary pressures until wage adjustments are reduced to levels that more closely approximate the growth in productivity."



Among delegates attending the District 4 meeting were, standing, W. C. Rowney, Milton; R. R. Wells, Oakville; U. C. Bailey and R. K. Walker, Streetsville, and Port Credit PUC manager W. H. Munden. Seated are Anthony Green, Oakville; H. E. Warner and R. Brogna, Port Credit.



OMEA president D. G. Hugill, left, presented long-service awards. Among the recipients were F. S. Thompson, Newmarket, for a quarter century, and H. D. Hamilton, Aurora, for 15 years' service. Others receiving 15-year awards were Mrs. Alma Walker, former mayor of Markham, D. H. Glass, of Aurora, and P. J. Blundy, Oakville.

In a submission to the Ontario Legislature's standing committee on government commissions, Hydro endeavored to explain the impact of inflation on its operations, Mr. Gathercole pointed out.

He said that on the basis of anticipated trends in wage and interest rates, "we projected a substantial increase in our electric power costs and rates, and we're required to meet these costs over the next seven years.

"There were some expressions of shock and surprise. But we have no reason to believe these projections were exaggerations. However, what was overlooked was that we were also projecting an equal or greater increase in personal incomes.

"People," he added, "must be out of their minds if they think we want to raise the cost of power. We don't. But we'd be derelict if we were to be good fellows and hold increases down to 2 or 3 per cent, run Hydro down, then let someone else take over. My prediction is that we'll have an annual increase of some magnitude in rates for some years to come."

Setting aside his prepared text after hearing a call for earlier notification to the municipal utilities of planned interim rate increases, Mr. Gathercole said the amount of data that must be collected before intelligent decisions can be made on rates each year is formidable, and speeding up the process is not an easy job.

"However, if we work together in a spirit of co-operation we can devise better ways of getting this information to you at an

earlier date which will allow you to plan ahead."

Hydro attempted to synchronize the interim rate announcement with the proposed increase to industrial customers, Mr. Gathercole said. Terms of direct customer contracts call for two months' notice of an increase proposal, which meant notice went out by registered mail on October 28. Notification was forwarded to the municipal utilities on the following day and public announcement was made November 1.

Regrettably, many commissioners first heard of a recent proposed rate increase through the news media, Mr. Gathercole added. □

actions speak louder than . . .

Actions speak louder than words.

And in 1971, economic conditions being what they are, the need for making decisions and acting upon them will be more important than ever, says Consumers' Gas president Oakah L. Jones.

Mr. Jones said that had it not been for Ontario Hydro's ability to make decisions and act upon them promptly, nuclear power for the people of this province "would be something that's still on the drawing boards."

He added that Hydro could well have adopted a "wait-and-see attitude until the bugs have all been ironed out of power generation from the atom.

"And if Hydro's engineers had done that, we'd still be awaiting its arrival in Ontario," Mr. Jones said.

He added: "Wishing and hoping for something doesn't make it happen. What is required today is men of action. But unfortunately, we seem to be avoiding telling our youth that it must face facts and make decisions.

"While thinking is important, especially the ivory towers of the business world, still must have people of action if we are to get ahead. And if we don't get ahead, someone else is going to get ahead of us," Mr. Jones said. □

june is . . . hydro month

The 30 utilities that comprise the District 4 membership will sponsor a Hydro month to foster interest in the supply of electricity and energy in their respective communities.

East York Hydro chairman J. L. Christie, who heads the district's public relations committee, said his group had been searching for some sort of project that would involve every utility in the association. He said June has been set aside and all utilities will be entitled to participate for the entire month, a week, or even a weekend.

But, he said, participation will be the key to success.

His recommendation followed the showing of a multiple slide presentation telling the Hydro in Ontario story. "Hydro in the 70's" was described by Ontario Hydro's director of public relations, J. J. Durand, as one segment of a total co-ordinated program intended to tell the Hydro story from its beginning to the latest efforts to control pollution.



ong ydro es

member

Hydro general manager D. J. Gordon has been made an honorary member of the AMEU. Tribute to Mr. Gordon's years of service to Hydro and his co-operation with the AMEU was paid by President John Murphy, of Barrie, at a recent ceremony. For nine years, Mr. Gordon, on the left, represented the company in an advisory capacity in matters discussed with the AMEU executive. He is the 19th person in the history of the AMEU to receive a life membership. □



nineteen

er stoves

are being taken to ensure safer installation of electric ranges and dryers in Ontario.

Regulations state that after July 1 all new homes must have a special outlet into which ranges can be plugged. A similar outlet must be provided if an electric clothes dryer is to be installed. Ranges and dryers will be sold equipped with a large plug to fit the special outlet. According to J. A. Dicker, manager of Hydro's electrical inspection department, adapters will be available to homeowners to convert existing appliances if they so wish. Dicker says the new regulations will "introduce a high degree of safety at nominal cost." Appliances will be easier to move from house to house, and for cleaning purposes. Appliances of this type are at present wired directly to a 240-volt

The changes in Ontario have been adopted by the Canadian electrical code committee and will eventually be implemented across the country," Mr. Dicker adds.

Other changes require that all mobile homes sold in Ontario after April 1 must be electrically certified by the Canadian Standards Association. Owners who move their units into Ontario from elsewhere will have to get them approved by Hydro inspectors.

Regulations were also changed as of January 1 to require manufacturers to install grounding devices on all electric fixtures intended for connection with flexible metal conduit. □

Golden time

Gold wrist watches were presented to seven long-service employees of Chatham Hydro at the utility's annual dinner. The men, from left, are Donald Henderson, Ed Holthof, Alfred Stevens, John Wallace, Gordon Sharpe, Roger Ripley and Robert Reid. Mr. Reid, Mr. Henderson and Mr. Ripley have each completed 25 years with the utility while Mr. Stevens, Mr. Wallace and Mr. Sharpe were honored for 40 years' service.

Mr. Holthof was presented with both a gold watch and an attaché case on his retirement after 17 years with Chatham Hydro. Presentations were made by Guy Morrison, chairman of the utility. □



Watches for seven

Cutting down on coal

A five-year agreement under which Ontario Hydro will purchase power from Quebec may ease the effects of fuel shortages at coal-burning power stations, says Ontario Hydro chairman George Gathercole.

Speaking in Woodstock, Mr. Gathercole referred to the five-year agreement under which Hydro will receive power on an interruptible basis beginning in June. The agreement also calls for the purchase of 500,000 kilowatts of firm power between 1976 and 1977 at a total cost of \$35,500,000.

Mr. Gathercole said that if the power purchases enabled Hydro to reduce coal consumption at its thermal plants, the least efficient stations — Lakeview, Hearn and Keith — would be affected.

Various factors such as environmental considerations, labor problems in mines and decreased production due to more stringent health safety laws, and a scarcity of rail cars have contributed to a severe shortage of fuels in the U.S. which has, in turn, affected Hydro.

In addition to easing this situation, the Quebec purchases will have the advantage of strengthening interties for increased power transfers in time of emergency.

The purchases may also help Hydro to defer some major capital expenditures which would otherwise be needed in the 1976-1977 period.

With the contract, Hydro will benefit indirectly from the

Churchill Falls power project in Labrador from which Hydro Quebec will draw large amounts of power. This in turn will allow Quebec to export more from its provincial power grid. □

Magic carpet



Wheeeeeee ...

Industry is finding increasing use for air flotation equipment, particularly where the transportation of heavy equipment is concerned.

Here, John Morralee, of the design and technical services at AECL's Chalk River Nuclear Laboratories, whizzes around a workshop on a cushion of air. Air casters on the underside of the experimental pallet are plainly visible.

Mr. Morralee is exploring the potential of air flotation for new experimental equipment around the NRU reactor at Chalk River. One problem at NRU is a five-ton shielding block which must be relocated, but which is inaccessible to an overhead crane. Air flotation may solve the problem.

Safety ABC

More than 1,100 utility personnel will be attending seminars over the next few weeks designed to cut down on accidents. This is part of the Electrical Utilities Safety Association's 1971 seminar series set for Haileybury on February 18. Seven others will be held across the province.

Harry Flack, manager and secretary-treasurer of EUSA, says, "We're going to emphasize the ABC's of accident prevention: Attitude, Behaviour and Communication." The meetings will involve accident investigation demonstrations along with first aid, hat, foot protection and eye protection sessions. A wide variety of safety equipment will be on display.

Other sessions are scheduled at Sault Ste. Marie on February 19, Sudbury on February 25, Chatham on March 8 and 9, Kitchener on March 11 and 12, Toronto from March 22 to 24, Smith's Falls on March 30 and 31 and Thunder Bay on April 22.

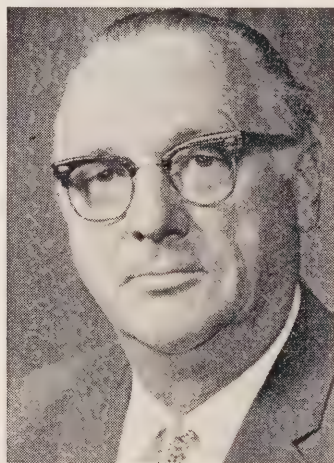
Utility get-together

Hundreds of delegates from municipal utility systems across the province will converge on Toronto's Royal York Hotel February 24 to March 3 for the joint convention of the Ontario Municipal Electric Association and the Association of Municipal Electric Utilities.

Among guest speakers will be John P. Robarts, retiring Minister of Ontario, and Alex Radin, general manager of the American Public Power Association in Washington. C. J. Hydro chairman George Gathercole will also address the meetings.

The problems of utilities both large and small will be discussed in business sessions which will range over such controversial issues as power costing and labor relations.

Thirty years



Hilmer Lofquist, 61, has celebrated his 30th anniversary as a member of Oakville PUC. His years of service were recognized by the PUC at a staff dinner.

Mr. Lofquist, an electrical appliance dealer, was first elected PUC in 1940 and served as president from 1943 through 1960. He stepped down as chairman but continued piloting negotiations between Oakville PUC and Trafalgar Township during amalgamation of the two communities, but remained PUC commissioner. He has just been elected for another two-year term.

Another stamp

Postage stamps commemorating achievements in the electrical industry were featured in the December issue of Hydro News and drew considerable interest from collectors. One Ontario

commemorating the 128,000-kilowatt Akosombo power plant of the Volta River Authority with which a number of Ghanaian employees, himself included, have been associated. For several years, Hydro has loaned the services of highly-trained people to assist in personnel training and the commissioning of plants in developing countries. In 1964, a 15-man team went to Ghana to assist with the Akosombo project, but the staff has been steadily reduced until only two remain today. There are now two people on loan in Iran, nine in Nigeria and 17 in India. A team in India is working at the Rajasthan nuclear power project, which is utilizing Canadian reactors. □



World's largest

Yale University Construction Fund is planning the world's largest university complex at Amherst, near Buffalo. And it will be all-electric.

Construction began last summer and the huge project, which will accommodate more than 50,000 students, is due for completion in 1977. It is expected the winter peak demand will exceed 100 kilowatts, which is only slightly less than the electrical requirements of London, Ontario.

After a number of studies and visits to other schools and colleges in the Northeastern United States, officials opted for an all-electric concept. They based their decision on economy in initial construction and the operation and maintenance of electric heating and air conditioning equipment; design flexibility, which will simplify future campus growth, and improved pollution control. □

Communications grant

A \$10,000 National Research Council grant has been made to McMaster University for the establishment of a communications research laboratory.

Research there will be designed to keep Canada advanced in the fields of communication and computer applications, say McMaster officials. Both fields have been described by the House of Commons as priority areas in shaping the future of science and technology in the nation.

Among the chief aims of the laboratory will be the evolution of improved systems and techniques with particular emphasis on the use of the digital computer as an on-line signal processing device in the solution of detection and estimation problems. Another important aim is to produce experts to meet growing needs of the nation's telecommunications industry, which has grown from a few telegraph companies into a \$5 billion giant

encompassing communications systems, data processing and transmission, microwave networks and, soon, communications satellites.

The industry is expected to double in size within the next 10 years. □

Upgraded farms

One of the best known men in Canadian agriculture has been appointed general manager of the Royal Winter Fair.

John E. Moles, who for the past 11 years has headed Ontario Hydro's farm sales department, has done much to improve the efficiency of farms in this province through his promotion of electrification. When he first joined Ontario Hydro, most of the farms in the province had 35 and 50-amp service. These were subsequently switched to 200 and 400-amp service, then to completely self-protected transformers and, finally, to a system of central metering.

He also played a significant role in working with manufacturers to encourage the development of such equipment as electrical brooders, fans and ventilating devices, heating cable for concrete floors in stables and hay-drying machines.

Mr. Moles is particularly well known in the farming world, having worked as a farm broadcaster for the CBC from 1954 to 1959 and having served as emcee on the television show "Country Calendar."

A 1936 graduate of the Ontario Agricultural College at Guelph, Mr. Moles is currently president of the Canadian Council of 4-H Clubs and a director of the Canadian 4-H Foundation. He's also a member of the Canadian Electrical Association, the Electric Club of Toronto, the Canadian Electrical Manufacturers Association and a number of professional groups such as the Canadian Society of Agricultural Engineers, Canadian Agri Marketing Association, Agricultural Institute of Canada, Ontario Institute of Professional Agrologists, Eastern Canada Farm Writers' Association and the Farm Buildings Standards Committee.



Leaders of the electrical industry paid tribute to Mr. Moles earlier this month at a luncheon in his honor. □

Detweiler portrait

At a ceremony recently in Kitchener, Energy and Resources Management Minister George Kerr unveiled a portrait of Daniel Detweiler, a former resident who became one of the main proponents of electricity in Ontario.

Mr. Detweiler has often been called the "Committee of One" for his promotional efforts early in this century which culminated in the establishment of the Hydro enterprise. He is said at one time to have led a delegation of 1,500 people to Queen's Park to advance the idea. He was a contemporary of Adam Beck, who later became the first chairman of Ontario Hydro.

On hand for the ceremony was Mr. Detweiler's son, Russell, of Barrie, himself a Hydro pensioner.

Donald Weber, chairman of Kitchener PUC, said the commemoration of Mr. Detweiler was fitting because "all too often people who have made far-reaching contributions are not properly recognized." The portrait has a place of honor in the offices of the Kitchener utility. □

Best seller

Fourteen hundred municipal utility commissioners will receive the material contained in the highly successful handbook, "Public relations for Hydro utilities." At present, each utility manager has a copy of the handbook.

Entitled "Guide to better news media relations," the first section has already been mailed in an orange folder to commissioners across the province. The section gives hints on how to approach editors, establish contacts and recognize possible news and feature stories. It also includes a sample news release. Eight other sections dealing with everything from the handling of rate adjustments to accidents will follow at monthly intervals.

The handbook material is being distributed through the OMEA office and follows a flood of requests from commissioners. Its publication was originally authorized by the OMEA-AMEU public relations co-ordinating committee. □

Odd bedfellows

Tropical fruit and power stations sound like odd bed-fellows, but an experiment being conducted by Niagara Mohawk and the New York State environmental conservation department may well lead to such an association.

The two organizations have joined in a \$25,000 research project aimed at utilizing the warm water discharged from the cooling systems of large thermal power stations.

An air-filled balloon-like structure will be built at Niagara Mohawk's Albany station on the Hudson River. It will be warmed by three different methods. Heat from the station's thermal discharge will be introduced through pipes beneath the soil, as a mist from a spray system and through a dry heat exchanger similar to a home baseboard heating unit.

Instruments in the structure will record relative humidity, temperature, heat loss and other factors. Practical applications such as using the heat to benefit animals or in the growing of tomatoes or even bananas have been mentioned. □

Schoolltime ... for teachers

About 1,000 geography and science teachers from six Metro Toronto boroughs were this month attending a series of seminars on the urban environment.

Sponsored by Ontario Hydro in co-operation with the Ontario Water Resources Commission, the Department of Energy and Resources Management and the Department of Municipal Affairs, the seminars were conducted by experts in a number of specialized fields relating to the urban environment.

The seminars were a prelude to an in-depth workshop on the urban environment for teachers this fall and a number of student forums.

In the planning stage is a teachers' dossier of study material on the environment and several classroom slide presentations about Hydro and how it is influenced by environmental and community considerations. □

Still tops

It's been established beyond doubt that electricity will continue to be the form of energy having the highest rate of growth for direct consumption even into 1990, says Douglas M. Fraser, vice-chairman of the National Energy Board.

He said electricity has only limited competition for some uses and none for others. But other fuels compete among themselves to varying degrees for various uses, not the least of which is the production of electricity.

Mr. Fraser pointed out that a National Energy Board study published in 1969 revealed that while total demand for energy in Canada in the period to 1990 would increase about 4 per cent a year, demand for electrical energy would increase about 6 per cent.

Modular construction may become the prevalent mode for residential construction over the next two decades and, to the extent that it does become common, it will probably involve use of electricity for all the energy needs of the dwelling unit.

"Ease of connection, flexibility of location of outlets, economy in provision of utility channels — all support the probability of this tendency," Mr. Fraser said.

His audience? Delegates to the Canadian Gas Association sponsored national technical conference in Toronto.

municipal briefs

Thieves in Tecumseh Township have walked off with a pole and transformer from an abandoned farmhouse. They also insulted to injury by taking the electric meter and a 40-gallon electric water heater to boot.

St. Catharines PUC has appointed Stanley Heywood, of Burlington, as assistant to general manager Ray Pfaff. Mr. Heywood worked for Ontario Hydro since 1938 and was consumer services superintendent in Niagara Region before his present appointment. The St. Catharines utility is also adding two new staff members to its customer service department.

Long-service pins have been presented to 11 employees of St. Catharines PUC. A 30-year pin went to John A. McMahon and a pin and watch for 25 years' service was presented to Ronald of Fonthill.

Iroquois Falls was reborn January 1. By order of the Ontario Municipal Board, the town has been resurrected two years after it disappeared through annexation by the Township of Caledonia. Later, the township decided to apply for town status and to adopt the name of the former town. Ceremonies marking the event are slated for March.

Bowmanville PUC has announced the appointment of Mr. Watson as electrical superintendent and assistant manager. Watson joined Ontario Hydro in 1944 and left 12 years later to work for the Township of Sandwich, near Windsor, as superintendent. Since 1967 he has been general superintendent of line construction for an electrical contractor.

Meaford PUC recently put a model of the Bruce nuclear power development on display. The model includes the Douglas power station, the new Bruce generating station and the adjacent heavy water plant.

George Frederick Shreve, manager of Oshawa PUC from 1951 to 1961, died recently. He had been closely associated with utility work for 50 years. Mr. Shreve, who was born in Ramoth Township, Kent County, took a position with the North Light, Heat and Power Company in 1911 and continued until his enlistment in the Canadian Army in 1915. On his return he was appointed accountant in the Oshawa office of Ontario Hydro. When Oshawa PUC was established in 1930, he joined the staff and became general manager two years later.

Former Newmarket Mayor W. A. (Bert) Kent has died at the age of 51. Mr. Kent had been active on the Ontario Police Commission, the York County Hospital Board and many other groups. He served 10 years on the Newmarket Hydro Commission.

Sarnia PUC commissioner J. G. Church died in December. He was 79. Mr. Church, who had been active in community activities for 20 years, had been a member of the PUC since 1962. He was slated to step down at the end of 1970.



don wright sees it

oted as we are in these columns to being a sensitive finger on the public le, particularly where it appears to beating out of synch with the accepted r, we may have been slipping slightly e vital area of biology. And don't r, the boys at the microscopes have e neglecting your genes.

Fr from it. They've been working over- and recent developments appear to nly the start of a general mucking ct with the building blocks of life — every sap of homo sapiens.

Fr one thing, they've had a good look a atom for the first time. University of riago scientists, with the aid of a ial 25,000-volt electron microscope, photographed individual atoms n a molecule and that's getting y deeply into the scheme of things. ons, as we all know, are the basic il of all elements and measure about billionths of an inch in diameter. At h point we'll tender a salute to the y at Pickering nuclear generating sta- who are now polishing their bi-focals honing their paring knives in prepara- r for the splitting of atoms associated t reactor startup. Splitting anything size calls for a keen eye and a steady r.

Te feat achieved in Chicago has been scribed as a step toward the "Holy a" of electron microscope work, which le ability to see a molecule and be able amine every atom within it.

Whatever the significance, we find it a disquieting after our own personal re in the field of optics the other night te living room. After a dozen passes a great deal of wetting and twiddling t the thread, we handed the needle c to the spouse with the grumpy ervation that hempen hawsers were ying up ships — not for sewing but- n on lace blouses.

Genetic engineering is the name of the A game and its protagonists stand to

make Dr. Frankenstein look like a kid with his first chemistry set. A Stanford University professor has predicted, for example, that couples may soon be able to choose the gender as well as the mental and physical characteristics of their unborn children.

We think this would be a mistake. Surely the guesswork is part of the appeal. Knowing in advance that one's progeny would be no better and no worse than the next fellow's, providing the thing was programmed properly in the first place, would be tough on the ego.

Once parents start manipulating the genes of their offspring we will soon have a race monotonously blond, blue-eyed, 6' 4" tall and with brains as sharp as the proverbial tack. On the other hand, we short, fat, bald-headed dummies will soon be able to name our own prices.

■ A British biologist has gone them all one better and announces that he has been able to produce artificial living cells. He figures that within 20 years scientists will be able to create animals of their own design so that a good gene man may be able to restore the dodo and the great auk and any of the other animals formerly deemed forever extinct due to man's ignorance and avarice. He also expects it will be possible to make people by that time and one gets the distinct impression that present people-making techniques are on the way out. One scientist has even predicted that within a few decades humans will never touch one another but deal with each other exclusively through closed-circuit television.

It's a grim thought, but it should put an end to such problems as jungle mouth and rough skin.

All this suggests that the Lamontagne report on science is right in its contention that the lads in our labs need more direction and more closely defined goals. At a time when our ecologists are bewailing pollution and the population explosion, what in the world is there to gain by developing new and better ways to reproduce?

Similarly misguided, it seems to us, are those Bell Laboratory electronic hotshots who have managed to develop some kind of mechanical contraption capable of reading aloud from a printed text in almost normal sounding English. They have, in effect, developed a talking machine and this we need like a hole in the head. According to statistics, Canadians are the gabbiest people to be found anywhere on earth. They have, in fact, chalked up a record of 16 consecutive years as the world's leaders in telephone conversations. People and babble are two com-

modities with which we are already plentifully endowed.

■ Last month, we had some complimentary remarks to make about the earthworm and how intelligent he is. Now comes word that even the flowers have feelings and tend to get uptight about some of the things we say. In a recent column, Bruce West describes an interesting conversation between a lady gardener and a zinnia in which the latter, while remaining mum (no pun intended) obviously became upset by the turn of the talk.

According to the report, the needle on a kind of lie detector attached to the nerve centre of the plant remained constant when the lady spoke to it of sunshine and warm rain but jumped all over the place when she observed, without changing her tone, that the bugs were coming.

In a similar experiment on TV, the needle became almost hysterical when the emcee picked up a pair of scissors and calmly announced that he was about to carry out a little pruning.

Fascinating, to say the least, and from now on we'll choose our words more carefully in the garden and perhaps be a little more selective in the species we plant. Hopefully, even the most alarming outbursts in English would pass inoffensively over the head of an African violet or a French marigold.

■ It is common knowledge, of course, that wheat plants have ears. But we were still surprised to learn that they can hear. According to a biologist at the University of Ottawa, the right kind of sound can make wheat grow up to three times normal size. A high-pitched whine is the kind of sound wheat seems to dig, but experiments elsewhere have shown that rice and corn grow faster to music.

As the science of biology advances, then, it seems as if we'll have to revise and reduce our list of behavioral patterns which have up to now prophesied a protracted stay in the nut house. Under the new rules, a lady seen passing the time of day with a petunia will be judged sound as a dollar and a farmer found fiddling in a field of corn (providing he has a violin) will only be acclaimed for his agricultural acumen. □

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the cover

Hydro News takes a look into the past in several of its articles this month. Here we see Red Hill and Jean Lussier, two daredevils who braved the Niagara River (see opposite) and crews working on the streetcar tracks in the Toronto of the 'twenties (see Golden Year for the TTC, page 14).

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Viewpoint

Time and tide

There is a fable about an ancient king who, prevailed upon to display his divinity over all things, set up his throne at the edge of the advancing tide and commanded the waters to halt. All that resulted was a blow to the royal dignity and a pair of wet feet.

Economic and social change is very much like the ocean in this respect. It is equally relentless and heedless of the plight of individual and institutions which stand in the way.

And the rate of change varies. The amount compressed into the last half century or so, little more than a grain in the full hourglass of history, has been unprecedented.

For thousands of years, the horse and the sailboat were the best man could do in moving himself and his goods from place to place. The speed of communications was dictated by the prevailing winds and the gait of an animal. Calculations and data processing were a pen-and-ink procedure while industrial production depended mostly on hand tools and individual skills.

Virtually overnight the world has been transformed by the machine and the computer; by electronics and jet transport. So fast has the social and industrial environment been changing that a single generation has been long enough to alienate the understanding between parents and children and between the people and the organizations which serve them.

Never before has the ability to adapt to change posed so great a problem. Man has a built-in aversion to change based on a fear of the unknown. The old ways are more comfortable, he is inclined to rationalize, and they worked well in the past.

They may still be the best in some instances. Change for its own sake is scarcely a virtue. But an organization, like an individual, will be hard put to flourish in the changing order of things unless it is prepared to remove the blinkers of preconception and discard the fetters of tradition. Success and even survival can depend upon open-mindedness and decision-making based on knowledgeable assessment and the awareness of change.

Hydro, of course, is no exception. Speaking at a recent meeting in Toronto, J. J. Durand, Ontario Hydro's director of public relations, put it this way:

"People, and service to people, is Hydro's reason for being. We know that people, their attitudes, values and needs are constantly changing – generation to generation, decade to decade, year to year.

"The challenge obviously is to gauge this change so that our role in society in terms of service to people remains meaningful. The trick, of course, is to respond to this change with logic, with reason and without panic to ensure that we don't disrupt the works in the process. The best way to respond is to start by being right."

Schedules, systems and methods are essential to the success of any organization but so are people and the needs of the community. What is the alternative to keeping up with the times in terms of attitudes, concepts and service?

"It is my opinion," says Mr. Durand, "that the success or failure of any public utility operation will be measured in terms of how effectively it responds to the demands of social change."

There is a danger in change and it can bring with it a host of unforeseen problems, but intractability is even more perilous.

It took thousands of years for the dinosaur and other pre-historic creatures to succumb through their inability to adapt to the changing environment. In the case of a corporation, blind allegiance to yesterday's attitudes, policies and procedures can accomplish the job in less than a decade. □



Jean Lussier plunged over Niagara Falls in a rubber ball on July 4, 1928. He lived to talk about it.

Plunge-O-Sphere, Step from your pit of Darkness into Light Dell.

by Bill Settatree

Some strange and fascinating characters came to defy the mighty Niagara. And many never left.

Carrying this weird message, a strange six-foot diameter rubber ball plunged over Niagara's Horseshoe Falls and was quickly retrieved by police. Inside, a somewhat damp individual struggled to shut the hatch which had sprung open during the trip. He was surprised to learn that he had already gone over the falls.

The date was July 15, 1961. The stunt was a complete surprise — one of the few incidents at Niagara Falls to take place in virtual secrecy. The occupant refused to talk about his trip or the reasons for the strange inscription. He was prosecuted under a Niagara Parks Commission by-law which prohibits such stunts, and then he disappeared.

The man called himself Nathan T. Boya, but there was speculation this was an assumed name.

For 150 years, the great cataract has provided the backdrop for many breathtaking performances by daredevils who have done everything from barrel rides to performing death-defying feats from tightropes strung high above the whirlpool. Visitors today can relive the Niagara's great adventures in the local museums.



In 1930, George Stathakis was set adrift in this barrel only to become a victim of the torrent. Right: Blondin carries his assistant across the gorge in 1859.

But they can no longer personally witness antics like those which characterized the falls in the 1800s and the first part of this century. Such feats are strictly outlawed.

Yet only a few years ago, an application was made to the Niagara Parks Commission for permission to bring a noted high-wire act to the falls. The idea was abandoned, not just because of concern for the performers but through fears for the safety of spectators gathering near unprotected portions of the escarpment.

It was the bizarre daredevil activities that helped make Niagara Falls the most famous address in the world.

They apparently started back in 1827 when three enterprising hotel operators — two Canadians and one American — decided something must be done to attract more people to the area. After weeks of planning, the three men, William Forsyth of the Pavilion and John Brown of the Ontario House along with Parkhurst Whitney of the Eagle Hotel on the American side, announced their plan.

They would send a ship, suitably outfitted with a cargo of wild animals, over the Falls. Huge posters were distributed far

and wide and a crowd of more than 30,000 assembled to watch the event. According to the story, two bears, which had been included in the cargo, managed to jump overboard and swim to shore just before the ship's plunge over the precipice.

The success of this sick venture spurred the promoters on to other events, but the greatest of all took place in the summer of 1859 when Jean François Gravelet, known as the Great Blondin, gained world fame for his exploits on the high wire. His first walk was on June 30 of that year.

About 5 p.m., Blondin walked out from the American side of the falls using a 40-foot balancing pole. A hushed crowd watched as he leisurely strode to the centre of the gorge and stopped. He then lowered a rope to the Maid of the Mist and hoisted a bottle of wine up to his perch where he drank it before completing his hike to the Canadian side. He was wined and dined before making the return trip.

Numerous stories are told of how the French aerialist returned to Niagara and performed such stunts as walking the rope with baskets on his feet or blindfolded and

even of his stopping to cook an omelette on a small portable stove. One of his exploits almost cost him his life and there were reports that gamblers, who stood to lose heavily, tried to sabotage the stunt.

It was in August of 1859. The aerialist decided to carry his assistant across the tightrope on his back. Blondin almost lost his balance when a guy line was either cut or snapped, causing the rope to slack in the middle. He is said to have ordered his assistant to step down on the rope. Then, when he regained his composure, the two of them made it to the other side.

In the years that followed, hundreds of thousands of people saw the Great Blondin perform. Among them was Prince Albert Edward, later Edward VII, eldest son of Queen Victoria. He watched Blondin cross the tightrope on stilts, then hook the end of the wire and slide down the shafts swinging high above the river.

It's reported that the prince gracefully turned down an invitation to be carried across the falls on Blondin's back.

The Frenchman's antics attracted worldwide attention and several other aerialists



Daredevil Lincoln Beachey dives into the gorge in 1911. At right, Bellini of Italy drops from the high wire to a boat.

...nted to copy or outdo him. None
...eded, although one rival, Italy's
...o Farini, competed with Blondin in
...mmer of 1864. First one then the
...performed incredible stunts. The
...a of the contest was a unique show of
...rks set off by the two artists at
...from their precarious perches.

...ne woman tightrope walker ever
...ered the fear of Niagara Falls and
...as Italy's Maria Spelterina, who in
...crossed a cable strung across near the
...y bridge.

...ing the whirlpool rapids downstream
...he falls was another stunt which
...ed the imagination of numerous
...-be heroes. Originator of the idea
...a Philadelphian, Carlisle D. Graham,
...n July 11, 1866, crawled into a
...roof canvas sack and fastened him-
...side a barrel.

...ne through the half-hour ordeal
...l and performed the stunt again
...five weeks, this time with his head
...ding from the barrel. The pounding
...almost deafened him, but otherwise
...none the worse for wear. Numerous

people made similar trips, several of them
in the interval between Graham's first
and second journeys.

For a long time the rapids were considered
the ultimate in daredevil activity. Nobody
tried to conquer the 162-foot-high falls
until early in this century, and the first
person to do so was a woman.

An old legend suggests that years ago the
Iroquois sacrificed an Indian maiden to
the great spirits each year. Supposedly this
was done after the harvest and all maids
were placed in a circle. The chief would
then shoot an arrow into the air and the
maid at whose feet it landed would be
selected for the sacrifice.

According to the story, she would be
crowned "Maid of the Mist" and placed
in a canoe filled with fruit of the harvest
and sent over Niagara Falls.

While the story has authoritatively been
put down to legend, since the Iroquois
never practised human sacrifice, it may
have had some bearing on the decision that
led 43-year-old Michigan school teacher
Anna Taylor to go over the falls in a barrel
in October, 1901.

Her wooden barrel carried her over the
Horseshoe Falls and near a reef where she
became stranded. Rescuers quickly helped
her to safety and she became known
from that day on as the Queen of the Mist.
She supposedly decided on the trip be-
cause of fear of a penniless old age. But
her efforts were in vain because she was
robbed of her proceeds and died in poverty
20 years later.

Mrs. Taylor's exploit brought world atten-
tion and she was quickly followed by
other would-be heroes. Some made it,
but most were swallowed up by the falls.

One family of rivermen, the Hills, became
legendary figures for their exploits in the
rapids. Members of the family were present
at most of the Niagara episodes. They
rescued some who survived and recovered
the bodies of more than 250 less fortunate
souls.

Red Hill Sr. received four life-saving
medals. While he, himself, navigated the
treacherous rapids in a barrel, he never tried
to go over the falls. His son, Red Hill Jr.,
was not quite so shrewd. Confidently, he



Ice dealt a severe blow to Niagara's Honeymoon Bridge in January, 1938.

planned to make the trip expecting that the worst he would suffer would be a good soaking. But on August 5, 1951, he met his death when the barrel disintegrated in the vicious currents. His body was recovered the next day stripped of everything but his wristwatch.

Still living in Niagara Falls, Ontario, is a French machinist, Jean Lussier, who braved the falls in 1928 riding a rubber ball type of contraption which he built himself. The six-foot sphere contained an inner lining of inflatable rubber compartments and Lussier sat in the centre. His trip was uneventful and he suffered not even a scratch. The only money he made from the journey was obtained from selling pieces of the rubber to tourists at 50 cents a time. Last Christmas, Mr. Lussier and his wife had a narrow escape when fire broke out in their apartment. They lost all their possessions in the blaze.

At the start of a great international river carnival in 1911, a small Curtis biplane was seen circling the falls. Its pilot, Lincoln Beachy, made history when he swooped to within 20 feet of the water, zoomed under the upper steel arch bridge and skimmed the superstructures of the lower

bridges in his climb from the gorge. He was the first man to fly a plane over the falls and under a bridge there. He was paid \$1,000 for his efforts.

Of all the oddities of Niagara Falls, perhaps one stands out above the rest. That was when a seven-year-old boy survived the treacherous torrent clad only in a swimming suit and life jacket.

The boy, Roger Woodward, will be 17 this year. For him, the date of July 9, 1960, will probably remain the most nerve-wracking of his life. He and his sister, Deanne, were in a boat above Niagara Falls when the craft got into difficulty and capsized.

Roger and the boat owner were swept away and carried over the falls. Seventeen-year-old Deanne was rescued by sight-seers just above the falls on the American side. The Maid of the Mist was cruising below the falls when Roger's red life-jacket was spotted. He was quickly rescued and was virtually unhurt.

Oddly enough, Roger missed being caught in an eddy which would have trapped him in the churning falls for several days. To this day, officials are bewildered by his survival. Usually, anything swept over the

Horseshoe Falls is caught in the current and ends up at the Maid of the Mist exactly four days later. Officials have been able to recover bodies with amazing accuracy, knowing their time of descent over the falls.

Yet another unusual incident involved the rescue of two men from a scow which was being towed upstream just above the falls. It was in the summer of 1918 and the scow broke loose from its tug. It drifted toward the falls and at the last minute, the two men on board managed to open the bottom doors to flood and ground the vessel.

Rescuers worked through the night and finally managed to get a breeches buoy to the scow. Rumor has it that one of the men's hair turned white overnight.

Jacob Earl McBurney, who worked at the Toronto Power station at Niagara, recalls the incident vividly. Mr. McBurney, now retired from Ontario Hydro, remembers being at work when the scow got into difficulty.

After his shift was over, he sat up all night to watch the rescue operations. He recalls the line getting snarled and of Red H



Acknowledgment for photographs accompanying this article is gratefully made to the late Eddie Hodge, Clifford Marsh, Mrs. W. Shields, Photo Specialty Company, the Niagara Falls Review and the Stamford Kiwanis Club, which published the book "Niagara Falls Canada, a History."

Ice conditions in 1909 almost stopped the American Falls and damaged the Ontario Powerhouse across the river.

volunteering to untangle it. Mr. Brney didn't actually see the rescue case "I had to get back to work just that time."

tr has had its effect on Niagara Falls, over the years, spectacular stunts taken place on the ice bridges which and beneath the cataract. In the early here were carnivals on the ice and shift shanties were built there to cater tourists.

old liquor and gambling was com- out authorities on either side of the were apparently loath to prosecute else they were unsure in whose juris- on the offences were taking place.

er disaster occurred on January 22, when between 50 and 100 people caught on the ice bridge when it loose. However, all managed to ple to safety and the incident was forgotten. In 1912, a crowd was just nining to gather for the usual fun when e bridge broke loose again. Three e were trapped and a crowd followed a jam moved down river.

ce efforts were made, including the ang of ropes from the bridges. How-

ever, the current was so fast that the efforts were fruitless and the three people drowned. Had the break occurred an hour or two later, a greater loss of life would doubtless have occurred. Because of this, activities on the ice have been forbidden ever since.

Ontario Hydro, together with the Power Authority of the State of New York, now installs an ice boom at the entrance to the river each year to prevent large masses of ice moving in from Lake Erie. Before this, large build-ups of ice frequently damaged powerhouse structures and jammed intakes and, in 1938, even wrecked the famous Honeymoon Bridge, which collapsed into the gorge with a roar.

No story about Niagara would be complete without some reference to the development of hydro-electric power. Water was first diverted from the Canadian side of the Niagara River in 1893 for the generation of electric power. A small 2,200-kilowatt plant was built just above the Horseshoe Falls and its output used to operate an electric railway between Queenston and Chippawa. Construction of the first of the two Sir Adam Beck-Niagara plants was started by Ontario Hydro in 1917 and

for a time it was the largest hydro-electric station in the world.

Huge sums of money paid by Ontario Hydro for water rights have helped in the development of 3,000 acres of parkland extending 35 miles along the Niagara River. These parks are among the area's greatest assets and are effectively administered by the Niagara Parks Commission.

Niagara Falls make the headlines with great regularity and their beauty and importance as a tourist mecca are of continuing concern. In 1969, man himself stopped the flow of water over the American Falls while US Army engineers conducted erosion studies in the gorge and along the crest. Remedial action has yet to be determined.

Today, the emphasis is on preserving the natural beauty of the falls for the more than nine million sightseers who make the pilgrimage to Niagara every year. Happily, perhaps, daredevil escapades and publicity stunts are a thing of the past. Although the mighty Niagara undoubtedly has a few surprises still in store. □

the end of an era

by Jean

TB

Adam Beck, Ontario Hydro's first chairman, devoted a great deal of time and energy to the establishment of the Queen Alexandra Sanatorium, just outside London. Now, thanks to the advances in medical science, the hospital is about to close its doors on this dreaded scourge.

Many of us today are familiar with going consumption? Yet a relatively short time ago, the term was on everyone's lips as the dreaded reminder of an acute form of tuberculosis.

Like so many diseases such as diabetes and pneumonia have been controlled through modern medical advances, TB is no longer the threat it once was, although it remains a public health problem.

It's quite a different story, though, from the First World War when Sir Adam Beck, Ontario Hydro's first chairman, discovered that his only child, Marion, had contracted the disease. She recovered — a feat considered a minor miracle in those days — and the incident led Sir Adam to build the Queen Alexandra Sanatorium in 1913 on, five miles west of his home town of London.

Hard to believe today just how rampant tuberculosis was at the turn of the century in Ontario. Records show 3,243 deaths from the disease in 1900. In contrast, deaths in 1968 in Ontario numbered 400, although medical authorities insist this must be further reduced.

The first sanatorium in Ontario was built in Weymouth in 1897 where treatment consisted of fresh country air, natural food, controlled exercise and plenty of rest. The



Girls' ward at the Beck sanatorium, as it appeared in 1926.



need for additional sanatoria throughout the remainder of the province was quickly realized and gradually other centres opened similar institutions.

From the beginning, Sir Adam Beck and his wife took a large personal interest in the Queen Alexandra Sanatorium – later to become the Beck Memorial – as well as donating large sums of money. Under Sir Adam's leadership, about 20 prominent citizens of London organized "The London Health Association" to provide financial support. A ladies' auxiliary was formed with Lady Beck as president. Then, as now, their prime role was that of fund-raising.

The Byron sanatorium, which was officially opened on April 5, 1910, consisted of an administration building, infirmary, private cottages, recreation hall, laundry and doctor's residence. There also were adjacent farm buildings to provide the sanatorium with its food and milk.

The first patients in the 42-bed unit were those with the disease far advanced. It became apparent that it would be much better to find infected people before they became so ill. For this purpose, early detection clinics were established at London's Victoria Hospital.

The first year of operation, Sir Adam promised the sanatorium that it would be lighted by electricity in time for Christmas. A colleague, Dr. Edward Buchanan, who

was general manager of London PUC for 37 years, recalls: "This was perhaps my most memorable Christmas Eve. Beck, to make sure the job would be finished, rode around all day on one of his favorite horses, while the line gang with wagons and sleighs and the superintendent and I in a cutter completed the job and switched on the power about 6 p.m."

Medical visitors from other Ontario sanatoria were much impressed with the new institution set in the rolling hills outside London. Tremendous improvements were noted in even the most advanced cases, although gradually a policy was instituted of accepting only those patients who had a reasonable hope of cure.

Many changes occurred at the sanatorium during the First World War involving the acceptance of military as well as civilian cases. Additional beds were needed and, sparked by Sir Adam, generous donations were received from London, together with grants from Ottawa and the province. This money enabled the building of a 90-bed, two-storey infirmary in 1918. Another 40-bed pavilion soon followed.

Sir Adam retained a never failing interest in the building program even though his busy schedule at Hydro forced him to

remain in Toronto from Monday to Friday. He took a boyish delight in doing menial jobs, as Mr. Buchanan likes to relate.

"He would, on occasion, sweep up picnic trash and shovel snow at the sanatorium. One Sunday, when the engineer had trouble with the boiler feedwater pump, he took off his coat and proceeded to take the pump apart, all the time entertaining me as a poor mechanic."

When Sir Adam Beck set up the London Health Association to operate the sanatorium, he did not worry too much about the finances. However, during this time Beck had to announce to a group of prominent businessmen including P. H. Pocock, chairman of the PUC, and other Beck's political opponents, that the bank was overdrawn by \$10,000. The bankers wanted their signatures on a note. The group immediately vanished leaving Pocock, who said that he would sign the note. Beck, with tears in his eyes, said, "I'll never forget you for this, Philip."

To provide care for the increasing number of patients, more nurses were continually recruited. A personal gift of the Beck family, the Marion Beck Nurses' Home, completed in 1918 at a cost of \$25,000. Beck said that at the time of the opening ceremonies, Sir Adam was so overcome with emotion that Lady Beck had to step forward and continue the address.



At the sanatorium were shocked to
 of the death of Lady Beck in October,
 1911. As well as giving of her time and
 day, she had often participated in
 efforts for patients, singing in a beautiful
 contralto voice.

Sir Adam continued as president of the
 sanatorium until his death in 1925, by
 which time the Queen Alexandra had be-
 come a million-dollar institution. Although
 there had been little money forthcoming
 from the province for the support of the
 sanatorium, it was Sir Adam's deathbed
 wish to have a public appeal. As a result,
 the people of the province subscribed
 \$10,000 to the Beck Memorial Endow-
 ment Fund for the maintenance in per-
 petuity of the sanatorium.

In 1941, the name of the Queen Alexandra
 sanatorium was changed to that of Beck
 Memorial in honor of its founder. But the
 changes brought more than a new name.

In 1944, streptomycin was discovered by
 Dr. Alexander Waksman working at Rutgers
 University, closely followed by Lehmann
 and Sweden and his work on para amino
 benzoic acid. Both of these drugs were to
 play a tremendous role in the treatment of
 TB. And, finally, the third "miracle" drug,
 isoniazid, was introduced in 1952 from

the United States, bringing amazing
 changes even in the most hopeless cases.

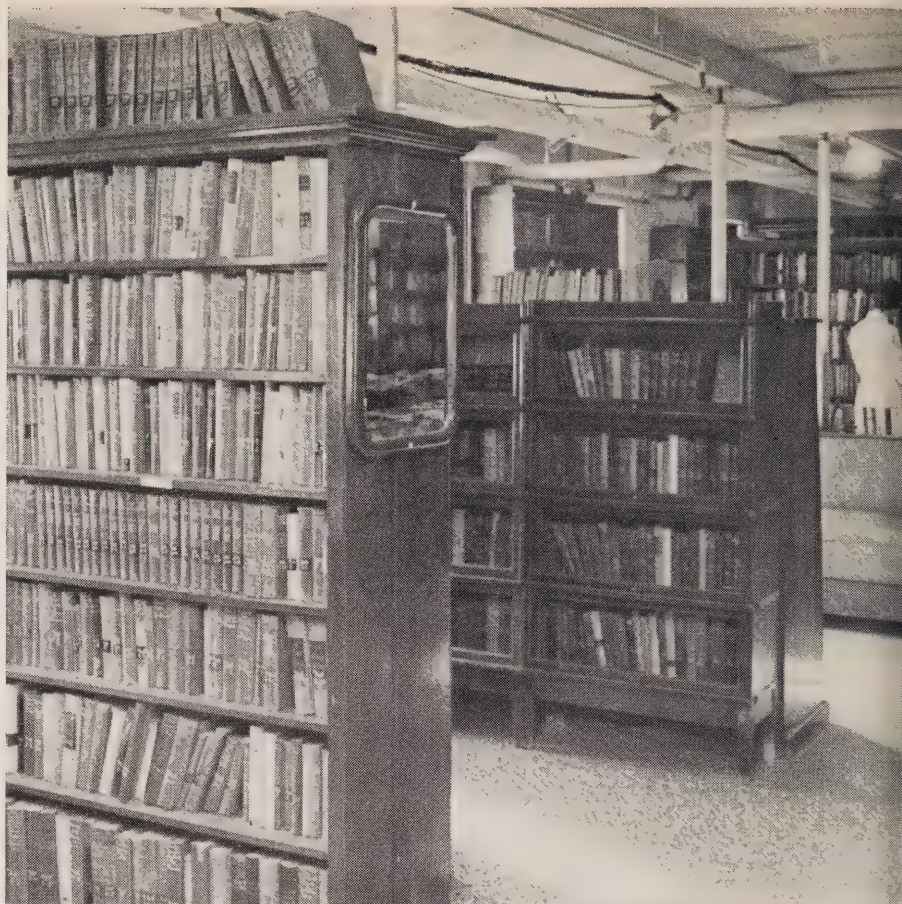
The large-scale program of TB detection
 throughout Ontario, together with the new
 drug therapy, dramatically reduced the
 number of tuberculous patients in the
 province.

Dr. Cecil Rorabeck, chief of the Ontario
 Health Department's Tuberculosis Preven-
 tion Service, says: "In the forties, there
 were approximately 5,000 beds designated
 for TB purposes, whereas today only 800
 are needed. This is due, first to the enor-
 mous decrease in the number of patients
 and, secondly, to the fact that the remaining
 patients on a drug program are able to
 remain ambulatory, coming into hospital
 for treatment only. Since there is a minimal
 amount of infectious TB today, it is quite
 safe for these patients to remain at home
 with their families."

Consequently, the need for sanatoria is
 continually decreasing and the Ontario
 Department of Health is gradually phasing
 them out. Already, units have closed in
 Cornwall, Ottawa, Brantford and Kitchener.
 And Beck Memorial will close its doors
 on a memorable history as a sanatorium
 next year when it will be used solely as a
 children's psychiatric hospital.

The transition began in 1961 when the
 provincial government purchased the

*Beautiful setting of the sanatorium is clearly
 evident from the air, while more down-to-earth
 views show the spacious grounds and well-
 decorated interior, including portrait of Sir Adam.
 Young patients, photographed in the early thirties,
 had their own Brownie and Guide groups.*



property and established the Children's Psychiatric Research Institute there.

Only one building was retained for the treatment and prevention of TB – the Sir Adam Beck Chest Diseases Unit. And this unit is slated to move into the latest project of Sir Adam's health organization, the University Teaching Hospital under construction on the grounds of the University of Western Ontario. One floor of the Teaching Hospital will be devoted to the chest diseases unit, while a small wing may be retained for chronic cases.

Miss Madeleine Theodie, who spent 42 years working at the sanatorium, wrote a moving account of her days there. "Beck Memorial as I knew it is no more," she said. "The farmlands with their wooded areas along the river carpeted with wild flowers in season; the spring where the watercress grew; the valley and sloping hills, became a golf course and the permanent home of the London Hunt Club for the enjoyment of many."

In one woman's lifetime, tuberculosis had changed from the tremendous problem of treating the terribly ill, to one mainly concerned with prevention. Although TB is not eradicated completely, it will never again be the dreaded disease to which Sir Adam Beck devoted so much of his life. □

Visitor Sylvia Entenman looks at equipment in the physiotherapy room. Sanatorium also has a well-stocked library.



the room of a hundred eyes

Mike McAteer

oom of a hundred eyes is the quietest
e in the plant.

eywhere, the atmosphere is almost fren-
as millions upon millions of beans are
shed from one operation to another.
e cascade down chutes in streams of
ie, red or yellow. They bounce and
orte on separating machines.

e're cleaned and de-stoned, classified
abolished, weighed and bagged — all to
background noise of the clank and
tl of machinery. But in the room of a
rred eyes, the occasional click and the
attle of beans is the only indication
ativity.

d eye is actually the control panel of
ch sophisticated unit that employs photo-
eric cells and electric impulses to sort
beans by grade and color. The 100
it at the W. G. Thompson and Sons Ltd.
essing plant in Blenheim are unique
orth America. So sensitive are they, in
they will detect—and reject—a diseased
amaged bean.

enheim (population 3,300) in Kent
uty is the headquarters for the Thompson
eation that covers much of South-

western Ontario and includes four other
processing plants in Hensall, Kent Bridge,
Rodney and Mitchell.

The Blenheim plant annually processes
about 200,000 one hundred-pound bags of
beans, mainly of the white and red kidney
variety. Although fully automated from
the unloading of the beans to the pack-
aging or bagging stage, the plant employs
about 45 full-time workers.

Reinforcements are called in when the
plant is in full swing during the busy fall
months. The plant, which is served by
Blenheim PUC, has a peak electrical load
of about 500 kilowatts.

After delivery by the grower, the beans
pass through a cleaner which rejects, by a
series of screens and air blasts, objects
larger or smaller than the normal beans.
With the elimination of stones, straw,
seeds and fine dirt, the grower is paid on
the weight at this stage.

A gravity separator takes over from here
and mechanically sorts the flow of beans

into three weight classifications. Floating
on a layer of air, a vibrating deck rejects
small, split and badly-weathered beans of
light weight. A similar machine rejects
stones and other materials the same size
as sound beans.

Red kidney and yellow-eye beans are
automatically packed or bagged depending
on whether they are destined for local
consumers, for export, or the canning mar-
ket. But white beans — the pork and beans
variety — get special treatment. They're
the ones which are sorted electronically
after being polished with a mild abrasive,
such as hardwood sawdust.

A unique optical system permits the entire
surface of each bean to be inspected as it
passes the viewing point. Light reflected
from the bean to a photo-electric cell
generates an electrical impulse which is
transmitted to a discrimination unit where
it is amplified and analyzed.

If the surface of the bean is stained by
disease, weather, mould, or is in any way
darker than the pre-set standard, the im-
pulse operates a rejection mechanism

which deflects the bean to a special conveyor. Each machine is geared to sort 40 pounds of beans an hour.

Designed and manufactured in Britain, the machines are leased to the Thompson firm and are the only ones of their kind in North America.

About 50 per cent of the beans processed at Blenheim go overseas. White beans are shipped mainly to the United Kingdom, which imports 1½ million bags of beans every year, more than the total production for all of Ontario. Michigan State is the main exporter of beans in North America, most of them going to European markets.

Canada enjoys preferential bean trade agreements with Britain, although entry into the European Common Market could change this position. Nevertheless, Wes Thompson, head of the bean processing department, says he's optimistic that his firm will continue to enjoy a substantial export market.

The use of containerization by transportation companies has made export of beans feasible on a year-round basis. Processed beans can now be taken to eastern Canadian ports and loaded directly on to ships, thus circumventing the freeze-up of the St. Lawrence Seaway.

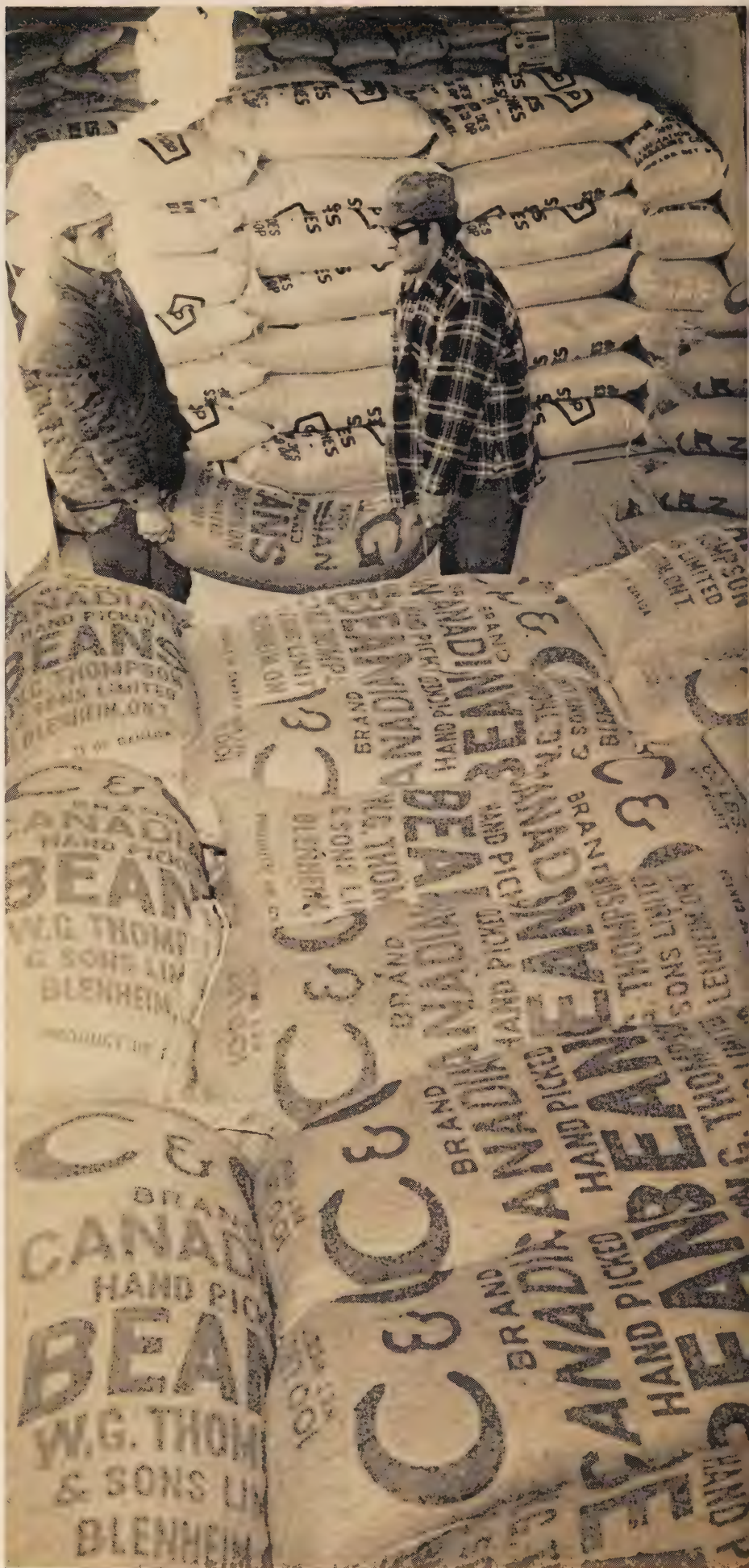
About 81,000 acres of white beans — producing 1,100,000 bags — were harvested in Ontario this year. Across the border in Michigan, about 6.3 million bags were harvested.

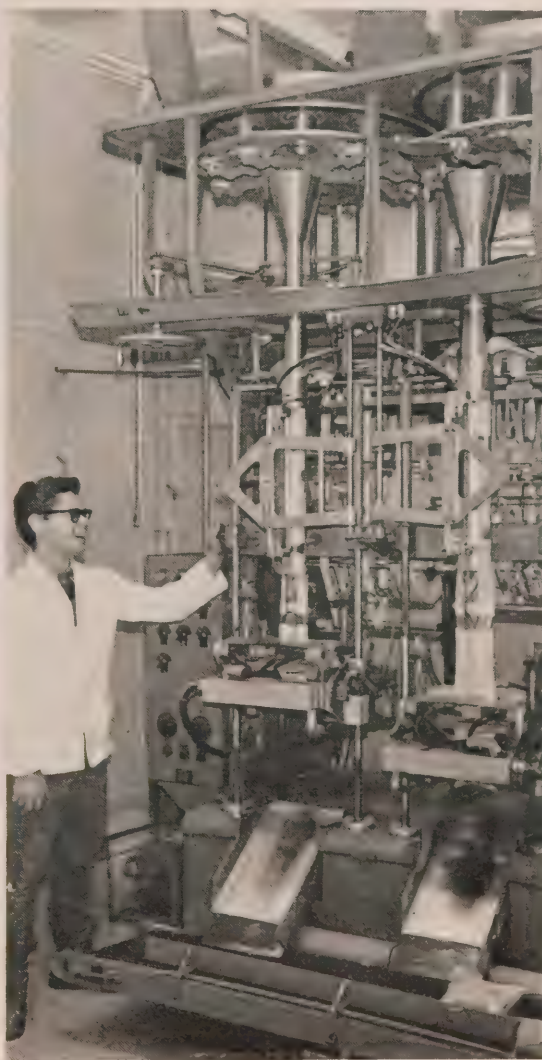
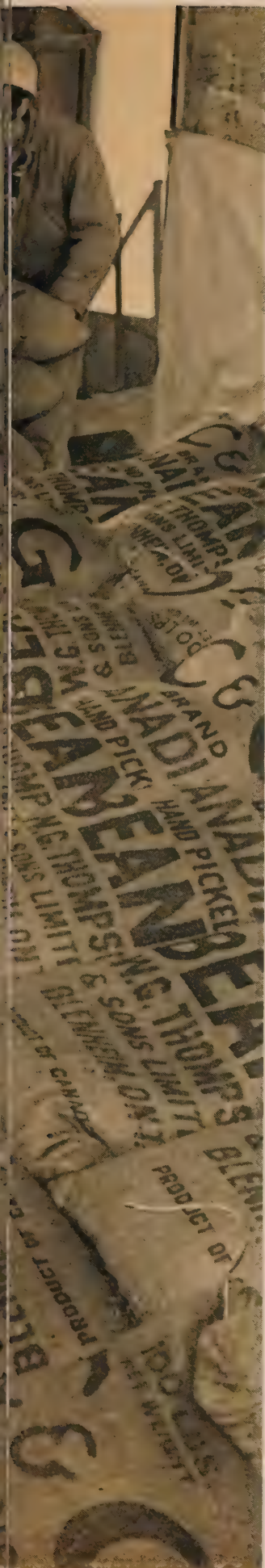
Over the past few years, the Kent yield has dropped by about 15,000 acres. Officials of the white bean marketing board blame a combination of weather, blight (bronzing) and mould for recent losses. But they feel that a better quality crop this year and expected higher prices for growers will produce an increase in 1971.

Tests are being conducted at the Ridgetown College of Agricultural Technology, about eight miles from the plant, to produce a bronze-resistant variety of bean. So far, results have not been too encouraging. The main emphasis of the tests is to change the chemical structure of the plant to combat bronzing.

About 100,000 bags of red kidney beans for the chili con carne market were harvested in Kent this year, many of them bound for Jamaica, Trinidad, and other islands in the West Indies. Traditionally, the Maritimes is the market for yellow-eyes. □

Workmen load sacks of white beans on to rail car bound for Quebec City. Wes Thompson inspects yellow-eye beans being emptied from truck into a bin while small bags of white beans are packed on the assembly line. Machine makes and seals polyethylene bags of various sizes.





GOLDEN for The YEAR GOOD OLD TTC



by Sheila Kenyon

In winter, the old horse buses had straw on the floor to warm your feet. In the event of a bad snowfall, the street railway provided sleighs to get you safely home. The price of a ride was five cents.

This year, the Toronto Transit Commission — the "TTC" as it is fondly, and sometimes not so fondly, called by Torontonians — celebrates its 50th anniversary. Though people are apt to believe today that the city's rapid growth is a phenomenon of the last decade or so, Toronto has burgeoned suddenly on a number of occasions. In fact, it was one of these periods, between 1921 and 1922, that led to the establishment of the TTC.

Before that time private, as distinct from municipally-owned, transportation systems had existed, culminating in nine public transportation companies, all with different fares, competing to serve the public.

By 1920 the city, which had added 300,000 people since the turn of the century and expanded its boundaries, was being strangled for lack of public transport. In 1921 the TTC came into being with a monopoly on public transportation other than taxicabs and railways. The city jumped ahead and improving, as has been proved since, the good public transportation opens new vistas for business, residences and tax assessment.

As far back as 1849, emergence of York as a desirable residential village sparked the first public transportation system in the city. An enterprising cabinetmaker named H. B. Williams produced four six-passenger horse omnibuses — like large stage coaches.



this shop on Yonge Street. These provided a 10-minute service from the old Lawrence Market to the Red Lion Hotel in Yorkville.

Successful were they that soon Williams added four larger vehicles each able to carry 10 passengers. Modest though the service was, it created a marked rise in business and residential development along the path — a precedent that was to be re-

peated many times, culminating with the multi-million dollar developments that followed a subway route.

Williams' horse buses didn't have an easy time. Toronto in 1849 was a roistering place full of taverns and newly arrived immigrants who could be rough in manner and forceful in their cups. Roads were surfaced "after a fashion" with stone and gravel.

Yet these primitive transport systems were important. And they were being already

superseded. In the United States, where cities faced problems similar to Toronto's, authorities were favoring "street railways." After all, this was the great era of the railway, so why not a street railway to match the transcontinental lines? Alex Easton, a Philadelphia street railway builder, visited Toronto and interested a group of businessmen in such a scheme. In 1861, the Toronto Street Railway obtained from the city a 30-year franchise and soon its horse-drawn vehicles on tracks were competing with Williams' horse buses.

How delightful it must have been to take a horse-car from downtown to the village of Yorkville! You would progress up Yonge Street at a speed "not to exceed six miles an hour." You had time to study the shop windows and even chat with strolling friends. In winter, there was straw on the floor to warm your feet and, in the event of a bad snowfall, the street railway provided sleighs to get you safely home. The price of a ride was five cents.

If the passenger lacked something in comfort, he was pampered compared to the driver who was outside the car in all weathers. He stood on a platform rather like a ship's captain on the bridge.

But technology was soon to sweep all this away. In 1884, one of the most momentous





events in North American transportation history took place – the world's first commercial electric railway was put into service between Strachan Avenue and the Exhibition Grounds in Toronto. This train ran for eight years, powered by electricity generated by a steam plant in the city. The same period saw the introduction of electric arc lighting on the streets.

The operation of the electric railway helped to convince city council that all public transport should be converted to electricity and when the Toronto Street Railway franchise expired in 1891, the city tried to take it over. But the public was not ready for municipal ownership. The city had to back down and instead issued a new franchise to a group headed by the Canadian financier and railway builder, William MacKenzie, later Sir William MacKenzie on condition that within three years the cars must be electrified.

About even this, there were mixed feelings. The newly established Evening Telegram violently opposed electric cars as dangerous. It advocated cable cars instead. Nevertheless, the first electric car, aside from the Strachan Avenue venture, ran along Toronto's Church Street on August 15, 1892.

To allay public terror of these self-propelled juggernauts, all sorts of safety devices were tried. Early cars carried a device like a child's hockey net in front of them to catch unwary pedestrians.

During the conversion years, it was common to see a new electric car with a horse-drawn bus on the rails behind it. But progress won out, and the last horse-car in Toronto plodded up McCaul Street on August 21, 1894.

In studying drivers' log books of those early days, the late H. Pursley, who became the TTC's unofficial archivist, commented that traffic problems existed even then, although somewhat different from today's. Commonly he came across entries explaining delays in terms such as "horse down on the tracks," "sleigh stuck on track," or "horse dropped dead in front of car."

The new electric cars even provided the volunteer firefighters of the day with some exciting runs. One car converted from horse power to electricity proved its inadequacy when, on a trip along King Street, a loose cable sent a trail of sparks and



Four modes of transportation popular at various times in Toronto are open car and trailer, banned as dangerous in 1915, double-deck bus which never enjoyed popularity because of drafty upstairs section, stage coach that between 1880 and 1896 ran between Richmond Hill and Toronto and the ferry, Trillium, built in 1910 and now moored at Centre Island.



is 1888 and the two-horse car is
 ing for passengers at a rather wintry Sunnyside.
 : electrically-driven streetcars are coping
 push-hour, 1924-style. Right: TTC's subway
 surface systems are controlled from this
 n nerve centre.

from beneath the car. Pedestrians
 the route reported a fire at Spadina
 ue, Bathurst Street, Niagara Street,
 an Avenue and Dufferin Street re-
 vely. Bewildered firemen thought
 the city must be ablaze, but found no
 of fire. Meanwhile, by the time the
 ding car arrived at its terminus, the
 was completely burned out.

after the turn of the century, engineers
 unced that power could be trans-
 d to Toronto from Niagara and Sir
 m MacKenzie, realizing that the To-
 steam generating stations would be
 seded, bought a controlling interest in
 the new Niagara Falls generating

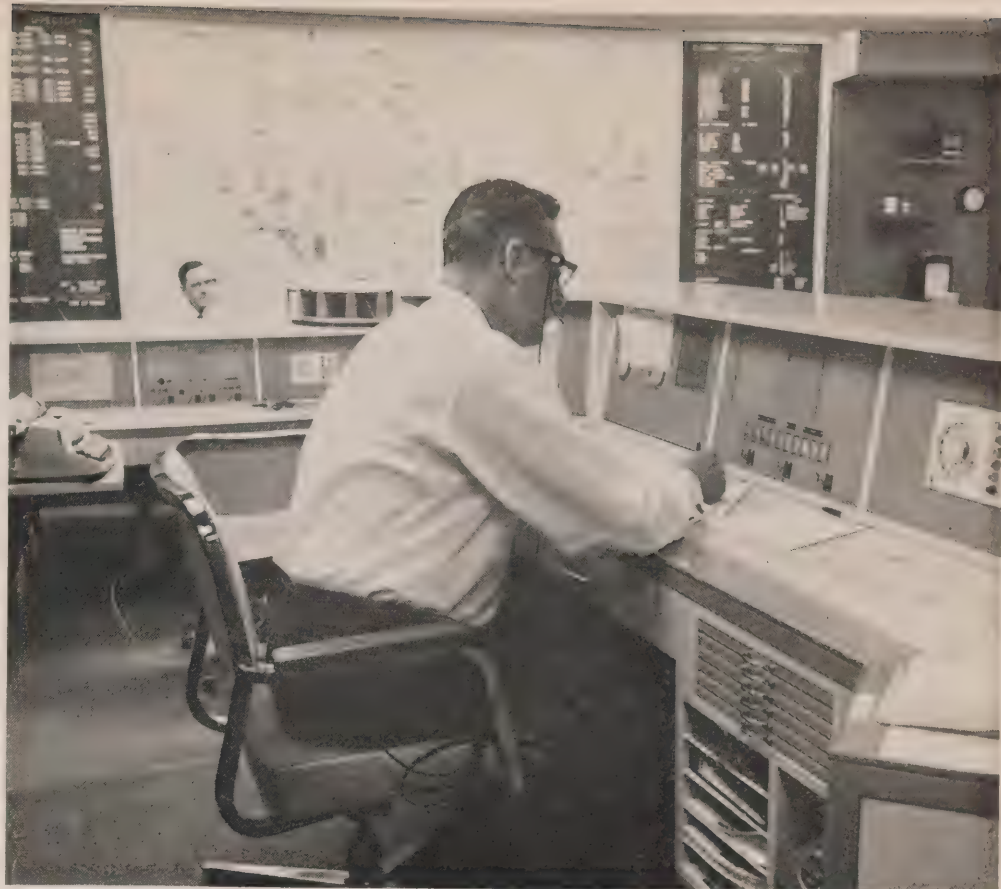
lectrification of the street railway
 y improved the service. Concurrently,
 y and its surroundings grew. Between
 and 1910, the city's population
 ed by more than 100 per cent to
 00.

ver, this growth, assisted though it
 y the public transportation system, in-
 roduced a backlash against the
 e itself. The private owners could
 would not, provide a service to
 the increase in people and business,
 he company refused to expand its
 re system beyond the city limits
 1.

unch came in 1920-21, when the
 annexed districts bordering Danforth
 e and Gerrard Street East, Bloor
 West from Dundas St., and St. Clair
 e, but they lacked proper transpor-

population was ready this time for
 ipally-owned transportation and the
 ame into being. It absorbed nine
 te transportation systems that had
 up in the city and suburbs, an area
 ng some 35 square miles, and im-
 tely embarked on a much-needed
 sion and improvement program.
 was one fare for the entire city, and
 nsfers.

s time, the driver had moved inside
 eel street cars had been introduced.
 ncluded a coal-burning stove for
 nter, and continued in service until
 ter the Second World War. But the
 de résistance of the street car era was
 TC car, the result of years of research
 President's Conference Committee
 sisting of representatives of major
 ortation companies across North
 ca — which produced a sleek, quiet



vehicle first introduced in Toronto in 1938.
 Nine years later, a modified PCC car
 resulted in the first all-electric vehicle using
 electric power for braking and heating.
 The PCC car is still used in Metro today.

The last large reorganization of the TTC
 occurred in 1953, when the Toronto Trans-
 portation Commission became the Toronto
 Transit Commission. The new TTC was
 responsible not only for the 35 square mile
 city, but for the huge, sprawling Metro-
 politan Toronto of 240 square miles, created
 by the federation of 13 municipalities.

Again, the TTC expanded to meet the
 challenge — more street cars, more buses
 and trolley buses. By this time something
 new was added — the subway. For many
 years, subways had been out of favor in
 North America. Toronto's was the first
 to be built since the Second World War.
 But it had been proposed long before that —
 in 1910. The dream of a subway, planned
 and proposed a number of times in the
 interim, finally came true when the first
 train ran on the Yonge Street line in 1954.

The TTC was always one of Toronto
 Hydro's leading customers. As the subway
 grew and extended its service into other
 boroughs, the Etobicoke, Scarborough and
 York utilities also began providing electric
 power.

The TTC now operates 30 substations
 throughout Metro that receive 13,800-volt
 current and convert it to 600-volt DC for

subway and surface vehicles. The sub-
 stations also receive separate electric
 power which is relayed to the subway for
 electric lighting and other purposes. In the
 event of power failure, battery power is
 available to light tunnels and stations.

The TTC is still expanding, as it must to
 meet the needs of one of the world's most
 dynamic cities. This year, the TTC expects
 to carry 325 million passengers, making
 it the third largest public transportation
 system in Canada and the U.S. in terms of
 passengers carried. It has 48 miles of street
 car routes still in operation, 29 miles of
 trolley bus routes and 476 miles of bus
 routes. The subway is 21 miles long and
 another 5½ miles is under construction.

In 1970, TTC vehicles covered more than
 71,000,000 miles, about three-quarters of
 the distance to the sun. The TTC has 6,500
 on the payroll, earning almost \$50,578,000
 in salaries and wages a year.

All of which indicates that the TTC, like
 the city it serves so well, has come a long
 way since great grand-dad trundled up
 Yonge Street on those new-fangled rails,
 behind the steaming horses, his feet
 swathed in straw, glad to have paid his
 nickel to ride instead of slogging it out
 on foot

in suspended animation

Both electrical utility commissioners and employees in the regional municipality of Niagara are "in a state of uneasiness caused by existing in an atmosphere of suspended animation," W. Sam Jennings, retiring president of OMEA District 5, told delegates at the association's annual meeting in Hamilton last month.

Mr. Jennings blamed former Municipal Affairs Minister W. Darcy McKeough for the prevailing employee-employer uncertainty, charging he had failed to act upon OMEA recommendations on the supply of electricity in the region.

But the provincial association's Government Legislation Committee, which made the recommendations, also came under fire in a resolution sponsored by St. Catharines PUC. The resolution deemed the committee's action "dictatorial." Mr. Jennings is a member of the committee.

The committee's recommendation was for the establishment of elected commissions within the new municipal boundaries, where viable, and the remainder of the municipalities within the region to be supplied by Ontario Hydro's rural system. But a decision as to the future of the commissions has yet to be announced by the provincial government.

The outgoing president said he "regretted to report that following submission of the brief to Mr. McKeough action, as far as the OMEA was concerned, stopped there."

Mr. Jennings said he sought assistance from former Provincial Secretary Robert Welch and later received a letter from Mr. McKeough informing him of his decision to "extend the term of office of the existing commissioners in Niagara."

Mr. Jennings argued that the committee's recommendations were what the people in the affected areas wanted. In most cases, the changes would mean a reduction in rates. He had informed Mr. McKeough that any delay in making a decision may in itself be a bad decision.

But A. J. Bennett, of St. Catharines PUC, said his utility was unhappy with the way in which the OMEA handled the situation.

In its resolution, which was eventually defeated, the St. Catharines utility suggested that although the affected commissions were given a preview of the committee's proposal to Mr. McKeough, they were not afforded the opportunity to seriously con-

sider or criticize the recommendations before they were turned over to the minister.

"Open discussion," the resolution said, "between the affected commissions, with the OMEA acting as an independent moderator, could likely have led to the negotiation of a compromise between the polarized positions indicated in the report of the task force."

"This type of action by the OMEA was dictatorial and deprived the affected commissions of their right to comment on the proposed operating conditions."

Mr. Jennings suggested St. Catharines PUC did not object to the recommendations, only the action of the Government Legislation Committee. He said that time alone dictated the action that was taken.

St. Catharines PUC called for the establishment of regulations within the OMEA to prevent the recurrence of this type of action, thus ensuring that local commissions have the opportunity to consider and approve the contents of a document of the type of the regional government proposals.

Task force chairman George Burley, of Niagara Falls, explained that OMEA secretary-manager E. C. Nokes visited all the affected commissions to show them the brief before it was turned over to Mr. McKeough. But time was short and it was thought necessary to have the report in his hands in October in the hope that changes would become effective in January. □

accident costs top \$450,000

Accident costs during 1970 to members of the Electrical Utilities Safety Association soared to more than \$450,000, says association manager Harry Flack.

Speaking to delegates at the District 5 meeting, Mr. Flack said utilities must adopt a policy that accidents will not be tolerated because, apart from anything else, they cost money.

No one can dispute that the money was well spent — from a moral point of view — for about 92 per cent of it went to rehabilitate workmen and pay compensation and medical aid claims.

Mr. Flack pointed out that once an accident has happened, the cost of an injury is a relatively uncontrollable factor.

Last year, the accident frequency among EUSA members continued to climb and a sharp increase in cost indicated more injuries of a serious nature.

Calling for the establishment of safety education and accident prevention programs among utilities, Mr. Flack said it to be realized these would mean more than just equipping all workers with hard hats and safety shoes.

"A sound safety program will be successful only when it's established as a philosophy by all who work in the utility. The most influential persons are, of course, the commissioners and managers, who by using their authority can insist on correct procedures," he added. □

call for cable TV review

A sweeping review of existing agreements between municipal utilities and cable television operators, and the establishment of a uniform cable policy covering the entire province is being sought by the local commissions that comprise the District 5 membership.

Delegates gave overwhelming approval to an Ancaster Township PUC resolution calling for the establishment of a joint OMEA-AMEU committee to review existing agreements and come up with a proposal.

Among the areas delegates want to probe are pole rental fees, and how to control them; forms of agreement to be used between the cable TV operator, Bell Canada (through joint use agreements) and the utility, and general policy.

Under the general policy classification, Ancaster PUC suggested the committee investigate whether the utility should deal with Bell Canada or directly with the cable operator, or both. Another consideration will be subdivision agreements.

And delegates questioned the feasibility of local utilities owning and operating their own cable television systems. They want to know how and by what means government policy and regulations prohibiting utility ownership of a cable television enterprise should be changed. □




"...ents cost money," EUSA manager
Flack told delegates.



Long and dedicated service to their communities was recognized when
OMEA president D. G. Hugill presented 15-year certificates to
A. L. Powell, left, of Port Dover, and Frank Laundry, of Beamsville.



...s who will head the OMEA's District 5 for the coming year include, standing, Lorne Reeder,
George; Sid Baldwin, Ancaster; E. B. McPherson, Port Colborne; Frank Kaupp
Charines; and W. Sam Jennings, Niagara-on-the-Lake, past president. Seated, Jack
y, Stoney Creek, secretary-treasurer; George Butcher, Simcoe, first vice-president; Stuart
le, Stoney Creek, president and D. Gordon Robertson, Lynden, second vice-president.



along hydro lines

Spring into summer

Ontario Hydro and its partner municipal utilities from the Manitoba to Quebec borders are launching an intensive campaign to install 6,000 central air-conditioning units in homes across the province between April 1 and June 30.

The campaign, dubbed "Spring into Summer," is the result of recent surveys undertaken for Ontario Hydro by a professional research organization which showed that homeowners are now "very much aware of central air-conditioning systems and have a definite interest in installing them."

To prove out the researchers' findings, a test market was set up in Essex County last year. A target of 300 air-conditioning installations was exceeded by 150. □

Utilities 'deserve more credit'

Ontario Hydro general manager D. J. Gordon emphasized the importance of electricity in pollution control when he addressed more than 600 delegates attending the industry conference and trade show of the Ontario Electrical League.

Mr. Gordon said that not enough credit is given to utilities for being controllers of the environment. Instead, they are castigated for being polluters. Hydro, he said, is considered a good target by the environmentalists because it's big and is "a so-called government agency."

He referred to the Hearn plant as a "pollution symbol" which is often the target of radio, television or newspaper comment.

"But when the Hearn plant is mentioned in these dispatches, these people seldom say we are building a 700-foot stack at a cost of \$9 million which will substantially reduce our contribution to pollution in downtown Toronto."

Also ignored, he said, is comment on the extensive program which will see four units at the station converted to natural gas as a further pollution control measure.

Mr. Gordon told delegates that electrically-heated homes will be a boon to pollution control. Electric subway trains will become increasingly important as a means of moving people in metropolitan areas with a minimum of pollution, and electricity will soon provide an alternative to the automobile.

Discussions at the conference centred on new construction techniques such as systems building and manufactured homes and how electricity can be adapted to them. Speakers included Paul Goyette, managing director of the Ontario Housing Corporation, and J. H. Stevens, president of the Canadian Electrical Manufacturers Association.

Mr. Stevens spoke at the National Electrical Week dinner held in conjunction with the conference. He was critical of the number of promotional programs being utilized by the Canadian electrical



Greeting the new boys

industry and called for a meeting of manufacturing, distribution and utility organizations to streamline present methods.

G. H. Pepper, of Ontario Hydro, was elected president of OEL succeeding Peter Thompson. The new vice-president is W. W. Bartlett, of Honeywell Controls. Directors include G. Marshall, of Canadian Chromalox, John Vanderheid, of Vanderheid Construction, Dr. J. E. Wilson, of Barrie PUC, and J. Anderson, of Leamington PUC. Mr. Pepper is shown at left welcoming Mr. Anderson and Mr. Bartlett, both elected to office for the first time.

Computer reader

In the suburban Chicago community of Summit, a handful of customers are now having their meters read by computer — while they sleep. The computer at the utility billing office dials the customer's phone number sometime between midnight and 6 a.m.

The phone doesn't ring. Instead, the meter "answers" with encoded information that represents the kilowatt-hours of electricity, cubic feet of gas, or the gallons of water consumed during the month. The computer figures, processes, and bills the customer within minutes.

The Summit program is actually the third phase of a test program for automatic meter reading being conducted by phone, gas, water utilities, and by some manufacturers of remote metering hardware.

Editorial advisor

In a bid to reach the consumer with its intensified electrical safety campaign, the Canadian Standards Association has engaged writer-broadcaster Constance Mungall as editorial adviser for its publications. Miss Mungall will be responsible for the distribution of information concerning the care and safety of CSA certified products.

Safety awards

Contrary to common belief, there is a prize for being last. In fact, there are three for being last in the number of lost-time accidents for utility workers over a calendar year and these were presented at the OMEA-AMEU annual convention in Toronto this month.

Owen Sound, Kitchener, and Chatham PUCs were given Electrical Utilities Safety Association shields to mark the low frequency of lost-time mishaps in three categories. Accepting the Owen Sound trophy from EUSA president T. H. Hogg, second from left, is N. H. Robertson. The Chatham shield was delivered to A. E. Stirling and the Kitchener award was accepted by Donald Weber.

The Owen Sound award was for working 59,428 man-hours without an accident, the Chatham one was for 138,467 inju-



winners

...an-hours and the Kitchener prize was for 269,529 accident-
...an-hours.
...honorable mentions were made of Richmond Hill Hydro for 12
...secutive years without a lost-time accident; Ingersoll PUC,
...ars; Newmarket Hydro, 12 years; Carleton Place Hydro, 12
...; Hanover PUC, 12 years and Pembroke Hydro, three years. □

Energy trends

...review on electric energy trends in Britain, the magazine
...r Engineering suggests that although it has a special
...ographical position in being an island state, with only one
...voltage direct current interconnection with mainland Europe,
...United Kingdom's electric power system "nevertheless ex-
...the same general growth patterns as other areas where
...is intensive electrical development.

...Furthermore," Power Engineering states, "it has become
...sary to standardize on 2,000,000-kilowatt generating sta-
...to build a high-voltage direct current infeed to London
...in uses the world's longest underground cable system, and to
...the automated means for controlling the overall power grid."
...tain, together with other European countries, enjoys a
...rior position with respect to energy compared with most of
...world, and this position is in close correlation with the UK's
...ard of living.

...At present, a minority of countries, mainly in the Northern
...sphere and with 30 per cent of the world's population, are
...nsible for 92 per cent of the world's electrical consumption.
...The same countries have, on average, electrical growth rates
...in are doubling every eight to 10 years.

...The US has the highest consumption of electricity, although
...the highest consumption per capita, and far from the highest
...th rate. Currently, between 36 and 40 per cent of the world's
...icity generation is being consumed in the US, with only 7
...ent of the world's population.

...The country with the highest per capita consumption appears
...le Norway, closely followed by Canada," says the US-
...ced journal of the electrical industry. □

Switch

...Indian-owned Bryant Press Ltd., of Toronto, printer of Ontario
...o News, is buying a North York book-manufacturing opera-
...that was sold to British interests 23 years ago.

...ant's president, John Weld, says his company has concluded
...gements to acquire the book-manufacturing division of
...McCorquodale and Blades Printers Ltd., a wholly-owned sub-
...y of a British firm, McCorquodale and Co. Ltd.

...The acquisition of a foreign-owned publishing concern by a
...ian publisher is a switch to what's been happening of late. □

No stranger



William Davis

Ontario's new Prime Minister is no stran-
ger to Hydro. William Davis was Ontario
Hydro's second vice-chairman from De-
cember 1, 1961, until November 7, 1962.
The present chairman, George Gathercole,
was first vice-chairman at the time.

Mr. Davis was recalled to Queen's Park
to take over the education portfolio from
the then Prime Minister-elect, John P.
Robarts. □

Farm sales boss



W. Ross Milne

W. Ross Milne has been appointed man-
ager of Ontario Hydro's farm sales depart-
ment. He succeeds John E. Moles, who
has left to become general manager of the
Royal Agricultural Winter Fair.

In addition to his agricultural engineer-
ing degree from the Ontario Agricultural
College, Mr. Milne holds a master's degree
in controlled environment in poultry build-
ings.

Mr. Milne joined Ontario Hydro in 1962
as a farm sales officer after a five-year stint as an agricultural
extension engineer with the Ontario Department of Agriculture
and Food in Halton and Peel counties. He recently completed a
one-year assignment as rural service superintendent in the con-
sumer service division, and for the past year has been a sales
engineer — special accounts and projects in Hydro's commercial
and industrial sales department. □

Symbol man



W. J. Killough

William J. Killough, an Ontario Hydro dis-
trict public relations officer, has been
handed co-ordinating responsibility for
Hydro's corporate symbol program.

As former public relations officer in
Eastern Region, Mr. Killough has been
closely associated with the symbol pro-
gram since the corporate design was
adopted in 1965. He will continue as
district public relations officer providing
liaison with Ontario Hydro's Central, East-
ern, Northwestern, and Northeastern regions. □

Ex-reporter gets PR job



D. K. Carmichael

Donald K. Carmichael has been appointed
public relations officer in Thunder Bay for
Ontario Hydro's Northwestern Region. He
succeeds H. Ivan Lloyd, recently named
public relations officer for Georgian Bay
Region.

A graduate in journalism from Ryerson
Polytechnical Institute, Mr. Carmichael
joined the public relations division's edi-
torial department in 1959 after six years
as a newspaper reporter in which he
served as Queen's Park correspondent for a number of provincial
dailies and on general news assignments for the Toronto Telegram.

Mr. Carmichael has worked as a staff writer in the editorial
services department; editor of the former Staff News; supervising

editor of employee information and publicity and more recently as a senior writer attached to the personnel branch.

His wife, Florence, has served as Metro Toronto Commissioner of the Girl Guides since 1968. □

They rapped



... and they rang

Among the highlights of the 62nd annual meeting of the OMEA and AMEU in Toronto this month was the presentation of community relations achievement awards.

Three plaques featuring a town crier's bell are awarded annually to utilities in the small, medium and large-sized categories for keeping customers informed of their activities.

This year, Financial and Commercial Affairs Minister Arthur Wishart presented awards to Meaford PUC, Peterborough Utilities Commission and Scarborough PUC. Accepting their prizes from Mr. Wishart, centre, are Roy Bishop, Meaford, Ron Sinclair, Peterborough, and Richard Cavanagh, Scarborough. Allan Bradley, of Mississauga, accepted an honorable mention certificate for his utility. □

municipal briefs

A Harriston electrical contractor, William R. Bell, 54, has been named Listowel PUC's manager. He succeeds Robert Moogk, who resigned last October. Mr. Bell has operated an electrical contracting business for 24 years.

Brampton Hydro has switched to monthly rather than two-monthly billing. Commissioner Elmore Archdekin says the main reason is to spare customers the inconvenience of paying one large bill every second month. Instead, he says, they'll pay two small ones — "it's less painful."

While he prefers mini skirts, Oakville PUC's general manager Ross Lamb has told female staff they can wear pant suits to work. Mr. Lamb said he "personally doesn't like pant suits, but they're totally acceptable in other business offices so our girls should be permitted to wear them, too."

Renfrew Hydro's recently acquired headquarters is getting a face-lift. Plans for the structure, which once housed a dry-cleaning establishment, call for a display area for electrical appliances and equipment.

Dunnville PUC has named W. G. Welbourn, recently retired from the Canadian Armed Forces, as manager to succeed John Dawson. Mr. Dawson remains with the commission as its general superintendent.

It's a fair distance from Penetanguishene to London, but when it comes to computer billing service you'd never know it, says

Penetang Water and Light Commission secretary-treasurer E. Lalonde. Mr. Lalonde says it takes about four days from the time the meters are read in Penetang, the cards forwarded to London for processing and the completed bills returned.

Long-range planning by Owen Sound PUC calls for a \$500,000 expenditure between 1973 and 1975 to provide a new headquarters building and expanded water department facilities.

A man who earned the distinction of becoming "grandfather" has retired from his job as executive assistant to London PUC's general manager. Arthur Frank Ferguson's utility career has spanned 45 years. He started out as an assistant operator at Ontario Hydro's Bare Point transformer station and rose to be manager of the former London Rural Operating Area. He moved to the London utility as its manager of engineering in 1965. Mr. Ferguson obtained APEO membership through his study and gained a business administration degree from Western in 1955. He had a grandchild at the time his degree was conferred.

Best yet

In 1970, the St. Lawrence Seaway experienced its best year since it opened in 1959, says the Seaway Authority's traffic report. Traffic increased through both the Montreal-Lake Ontario and Welland sections.

The volume of wheat and other grain shipments increased substantially in 1970, contributing to more downbound tonnage through both sections, while the amount of iron ore shipments had a similar effect on the upbound tonnage.

Principal commodities carried through the Welland Canal section were iron ore, bituminous coal, wheat, barley, manufactured iron and steel, and corn. These six products accounted for 73.9 per cent of the total traffic.

Coal tonnage through the Welland Canal during the year totalled 10.7 million tons, of which approximately 5.7 million tons, or 53 per cent, was delivered to Ontario Hydro's R. L. Heald and Lakeview generating stations.

Crowd pleaser

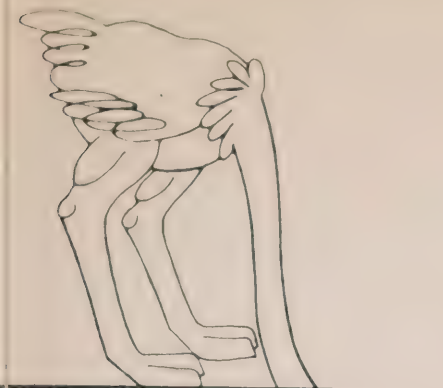


Student art

Many youthful artists got a boost recently from Niagara Falls Hydro.

Art students at the Niagara Falls Collegiate and Vocational Institute never had a place to display their talent. But just after Christmas decorations were removed, Hydro's display window was filled with the students' work. Hydro provided some spotlights to show off the originals to their best advantage.

Because the building is right by a bus stop, on one of the city's busiest thoroughfares, thousands have stopped to look at the work. Even more encouraging for the onlookers, the area around the outside of the office was warmed by infrared heaters.



Don Wright sees it

One of the most promising developments in the last few years insofar as the public is concerned is the hot water bed. Once the bugs have been ironed out (and we don't mean bedbugs) the beds could represent an important new source of revenue both for the water and electricity supply authorities.

All the rage south of the border, water beds (plastic mattresses filled with electrically-heated water), have been flooding the market albeit with a few eddies of dissent. Civic authorities are among the skeptics. Some municipalities have banned the bed until it can be proved that the heating element wouldn't barbecue the sleeper in the event of a leak.

At least one fire chief takes the opposite view. "If someone with a lighted cigarette goes to sleep on a water bed," he postulates, "he may wake up wet, but at least he'll be up."

Building inspectors are also cocking a wary eye at these new king-sized hot-water bottles from the load-bearing point of view. Most post-war housing was designed, apparently, to take a "live" load of the floors of 40 pounds a square foot. A water bed weighs in at 62.5 pounds a cubic foot so that the live part of the load stands a good chance of ending the night's activities in the basement.

Whatever its sleep-inducing virtues, the water bed is being advertised more for its allure than for repose. Dubbed the Water Bed by one retail outlet, it's said to imitate all manner of things this side of Greenland. One older psychologist has suggested that the rocking motion should be recommended for insomniacs.

Even if that as it may, it's to be hoped the manufacturers never relax their quality control standards to meet the competition. A sudden leak could turn a sweet dream into a damp nightmare.

And there have been other developments on the advertising front. Right here in Ontario, the licensing authorities have

approved airing of the first radio commercials in the province to transmit the sound of beer pouring from a bottle. A spokesman from one brewery describes this as a "breakthrough" and allows as how the ability to use sound effects "adds a completely new dimension to beer advertising through this medium."

Hurrah for progress and all that sort of thing, but we can't get too excited. To us, the sound of beer pouring from a bottle is indistinguishable from the sound of any other liquid pouring from a bottle with the exception, perhaps, of fatter matter such as catchup or lumpy buttermilk.

If there are any other sounds commonly associated with beer drinking, they have escaped us. Over-indulgence, particularly in conjunction with certain foods, can, of course, give rise to a whole new world of sound but this would hardly be conducive to the sale of suds.

■ For sheer persistence and ingenuity, though, it's hard to beat the advertising people. They leave no stone unturned in their search for new and more diabolical ways to bring us news of another fine product.

Among the more disagreeable developments which have come to our attention of late is a scheme to plaster the interior of office building washrooms with commercial messages of deep personal significance. For \$50 a month, per unit, according to a report in *Ad Age*, advertisers can now capture the attention of all visitors utilizing the toilet facilities in a number of buildings in downtown US centres.

It's a captive audience, all right, and no doubt the new medium will prove a boon to products previously considered too delicate to foist on a mixed audience. We should be steeling ourselves, perhaps, for the next stage of this development which will undoubtedly involve the use of sound. We can almost hear the haunting strains of Johnny Watercloset and his Flatulent Five bringing us grunt and groan music from the damp and mysterious depths of white china: Smile a pile . . . use Jason's axle grease.

The hucksters are also taking full advantage of the pollution scare to turn a fast dollar. Farthest out among the more recent schemes is the one by some enterprising Danes to upgrade the tinkle in our tankards. On the theory that vintage scotch and fine old Kentucky bourbon should not be subjected to the indignity of brash young ice cubes manufactured from the tainted waters of civilization, they've turned to the pristine polar bear pastures of Greenland. Ice chipped from 2,000-year-old glaciers is being put up in two-pound

packages for sale as "a whisper from bygone ages."

It's a nice theory, but we'll continue to take our chances with the home-made variety. So far, we have been unable to trace a big head or a fuzzy tongue to a bad ice cube.

■ And judging by a report from Hertfordshire, the English are casting off their inhibitions in the earthy field of product promotion while retaining a full measure of heavenly integrity. The item in question concerns a local vicar who is going on TV with a 45-second plug combining an appeal for God and margarine. The parson has the backing of his bishop who "sees no reason why a sincere comment on margarine should not be coupled with a sincere word about God."

It's about time men of the cloth had a chance to cash in on their high credibility ratings — so long as they refrain from attributing preference for any particular product to the heavenly host.

■ Mores change in the course of time, but not at the same rate. England's most exclusive girls' school recently shattered tradition by allowing its students "limited contact" with boys. The girls of Roedean will thus be allowed to indulge in such pastimes as bridge in mixed company and under close supervision.

Hard on the heels of this racy development comes word of a new sex game introduced at a children's toy fair in Harrogate. An advanced version of strip poker, the game includes all manner of titillating tidbits and is justified by its inventor on the pious grounds that "it's straight sex — we can do without sexual deviations."

Contrast this with the advice proffered by Lady Gough (1863) who, as near as we can figure out, was a kind of upper crust English version of Emily Post.

"The perfect hostess will see to it that the works of male and female authors be properly separated on her bookshelves. Their proximity, unless they happen to be married, should not be tolerated."

In closing, we might mention a series of lectures to be given by one Dr. Herzog as a result of a recent tour he made of the Continent. They will be entitled "Europe through the Eyes of a Proctologist," and should provide a unique perspective. What's a proctologist? Let's just say he's the opposite to a dentist.

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• pet clinics • making use of waste • Pellatt the plunger



ontario hydro news

april/1971





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the cover

It's a pretty scary business waiting to see the vet, and the patients need all the consolation they can get. Ron Brown took this photo in the waiting room of Scarborough's Amherst Veterinary Hospital, which like many animal clinics today lacks nothing in either the skill of its practitioners or the latest aids in medicine (see page 12).

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Viewpoint

Candu – a viable concept

Two recent developments in the nuclear power field appear to have been misinterpreted in some quarters with regard to their significance in relation to the Canadian program. These are the assumed failure to win the Australian contract for a nuclear plant and the suggestion that Canada undertake to build fuel enrichment facilities.

Whether or not Australia has opted for another system remains to be confirmed at the time of writing, but if this is the case it is unlikely that the decision was based purely on technical considerations of economics and dependability.

The factors involving the choice of a power reactor by a particular country and electrical utility are complex and constantly changing. As is more often the case than not, the overriding reasons for selection or rejection lie outside the realm of technical competency.

On the other hand, an adverse decision is bound to cause disappointment insofar as the development of a major export market for reactors is concerned and it may well be that as Federal Energy, Mines and Resources Minister J. J. Greene has indicated, a re-assessment of this aspect of the Canadian program is needed. "It may be," Mr. Greene is reported as saying, "that we may have to review the prospects in world markets." Canada may not be powerful enough to compete for export reactor sales, he suggests.

Whatever the outcome, it will provide no grounds for the inference that the Candu system is not right for Canada. In fact, the passage of time and the unfolding developments in the energy supply picture only tend to reinforce the validity of the reasoning which led to the unique Canadian nuclear concept.

Flexibility is the hallmark of the Candu reactor and the scope for refinement and improvements within the basic concept is enormous. Cooling and fuelling techniques are both viable.

Aside from the original heavy water cooling concept employed at Douglas Point and Pickering, the Gentilly plant in Quebec employs ordinary boiling water as a coolant while other approaches being studied and developed promise even greater economies.

Recycling of plutonium from spent fuel offers future savings in fuel costs as could the use of uranium carbide and uranium metal. Candu could even be adapted for use with enriched fuels as J. Lorne Gray, president of Atomic Energy of Canada Limited, recently pointed out in dispelling the suggestion that the Canadian type of reactor would become obsolete if this country set up its own enrichment industry.

"If Canada had its own supply of enriched uranium and the price was right for it," Mr. Gray said, "there is no reason why the Candu reactor couldn't be adapted to use it." He said the Canadian reactor could be offered for sale with an option in design for either natural or enriched uranium.

According to O. M. Solandt, chairman of the Science Council of Canada, it would be a serious mistake to lose confidence in Candu at this point in time. "The next three to five years will tell whether we have a winner or not," he says, and the Canadian system is still a valid contender to international sales.

How great a swath Candu is destined to cut on the international scene remains to be seen. What does appear evident is that Canada has come up with a sound and viable system of producing power by nuclear fission which is entirely suitable for large and expanding domestic requirements.

Engineering and technology at the manufacturing and hardware design levels appear now to be the critical factors. The ingenuity and perseverance so far in evidence are most promising. □



Trimming our wasteline

By Bill Settle

Electricity will play a leading role in helping to clean up the environment through the recycling of waste into useful products.



Before long, millions of gallons of industrial wastes will be transported to a central disposal plant in Mississauga, many of them to be recycled again. Each load will be analyzed in a laboratory similar to this one, before treatment.

This article could have been printed on paper from a previous issue of Hydro News, or Maclean's magazine or even last year's mail order catalogue. It could have been, but it wasn't. Because Canadian industry is not yet at the point where old newspapers, magazines and catalogues are being used over and over again.

But the recycling of other forms of paper has been going on in Canada for 50 years and the stock used in this publication was

produced by a company which employs the process.

Abitibi Paper takes old ledgers and business forms and processes them into magazine stock and newsprint at its Provincial Papers plant in Thorold, Ontario. In half a century, more than 500,000 tons have been recycled. Operations were recently stepped up and an estimated 30,000 tons of paper will be reused this year.

Abitibi's record shows that the idea of

recycling, bandied around so much in our pollution-conscious society, isn't all that new. However, it's a concept that's really gaining momentum.

It's more difficult to recycle newspapers and magazines than other forms of paper because of the large amounts of ink. Recycling in this area is just getting started in the United States and the results could reduce the country of a major pollution problem.

techniques are also being developed to many other items cluttering the countryside and clogging lakes and streams by castoffs of a waste-oriented society in which it is usually cheaper to manufacture new products from natural resources than to recycle used material.

Perhaps the most significant Canadian development is the establishment in Mississauga of a waste control utility to handle virtually all types of liquid wastes within a 75-mile radius of Metropolitan Toronto.

A plant is being developed by the engineering firm of Acres, Limited, and is scheduled for operation later this year.

In the first stage, the utility will operate as a small liquid-waste treatment plant for industry. The next stage will deal with solid wastes and, finally, the plant will recycle waste materials for productive uses.

P. Ogilvie, president of the new company, says approximately 30 million gallons of liquid waste will be handled by the plant each year. It includes substances like crankcase oil, plating wastes, acids and caustics. Such items as topping materials could be easily produced from some of these wastes.

Ogilvie suggests that a long-range benefit from the plant will be the establishment of industries in the Mississauga area, some wishing to be close to the disutility and others who would use by-products.

Wastes will be transported to the 100,000 plant by truck. Each load will be thoroughly analyzed, deposited in a dedicated receiving station and neutralized with chemicals.

Probably the chemicals from one industry will be used to neutralize those deposited by another, Mr. Ogilvie says. Certainly, a large utility will be able to dispose of wastes much cheaper than individual industries.

A by-product of the process will be drinkable water which, after inspection by the Ontario Water Resources Commission, will be piped into Lake Ontario. Also produced will be inert solids, safe for landfill uses, and steam. Acres has combined British and American interests to bring the process to Canada.

While the recycling of waste into drinkable water might sound far fetched, it is practical. The major manufacturer of water pollution control equipment, W. C. Messersmith, said recently that within 10 years the entire water supply in the US could be recycled on a daily basis.

When the public gets over the shock that clean water doesn't and can't come from mountain streams, we will be far

better off," he said, pointing out that currently discarded water sources, such as sewage, could be made cleaner than many community water supplies.

Research in this area is well advanced by the Ontario Research Foundation, which is conducting a study commissioned by Central Mortgage and Housing Corporation. The aim is to produce a closed system

of water supply and sewage treatment for a development housing up to 1,000 persons, although officials say entire cities could be serviced under such a plan.

Dr. Fred Besik, a chemical engineer at the foundation, says tests have shown that the recycling of water and sewage in an enclosed environmental system is feasible. He suggests that the costs would be up

Energy and Resources Management Minister George Kerr and Roberta Golightly, president of the Burlington Citizens' Committee for Pollution Control, examine tin cans, bottles and paper which people have taken on a voluntary basis to an experimental recycling station. The town and the provincial government have since embarked on a more ambitious project to determine the feasibility of a full-scale recycling program.



to 50 per cent lower than present municipal systems where water treatment plants and sewage disposal plants are operated separately.

The ORF has produced recycled water which is technically too pure to drink. Certain minerals have to be added to make it palatable.

While research to date has been confined to the laboratory, a pilot plant capable of handling up to 10,000 gallons of waste sewage a day will be built this year. Sewage

will be drawn from a residential development nearby.

The use of glass, cans and other indestructible garbage is taking on new importance, too. The Glass Container Council of Canada, in co-operation with Scarborough authorities, last year paved a 600-foot roadway with what they called "glasphalt." Glass chips from reclaimed bottles made up 65 per cent of the asphalt mix and the roadway appears to be standing up well.

Skid tests have indicated that stopping distances are shorter and the roadway more durable than ordinary asphalt. With any new program, there has to be a catch. The short stretch of road took more than 300,000 bottles and officials say an economic method of reclaiming this glass has yet to be found.

Another example of a useful product manufactured from waste is at Port Credit where the St. Lawrence Starch Company has been able to produce yeast from

Interior of a waste disposal incinerator building in Etobicoke. This plant is similar to one being built in Mississauga by Acres Limited. It will be equipped with a high-efficiency scrubber, which will permit it to be used for a wide range of wastes without emitting pollutants into the atmosphere.



plants formerly discharged from the plant. Nearby, an industrious citizen, William Simms, has developed a way of demolishing railway boxcars without burning them and polluting the air.

W. Simms uses a high-powered water lance. The pencil-thin jet of water rips through wood faster than an electric saw. It takes him only five hours to dismantle a boxcar that used to take several wreckers a week. When finished all that is left is a steel frame, which goes to the blast furnace, and wood chips that are used in the production of chip board.

The disposal of wood, in the form of dead trees, has become an increasing problem with new anti-burning legislation. However, the city of Peterborough thinks it has not one licked. Dead elm trees are sold to Antar Packaging and shipped to the company's kraft paper plant at Trenton. Other cities are also disposing of trees in this manner, and are making money to boot.

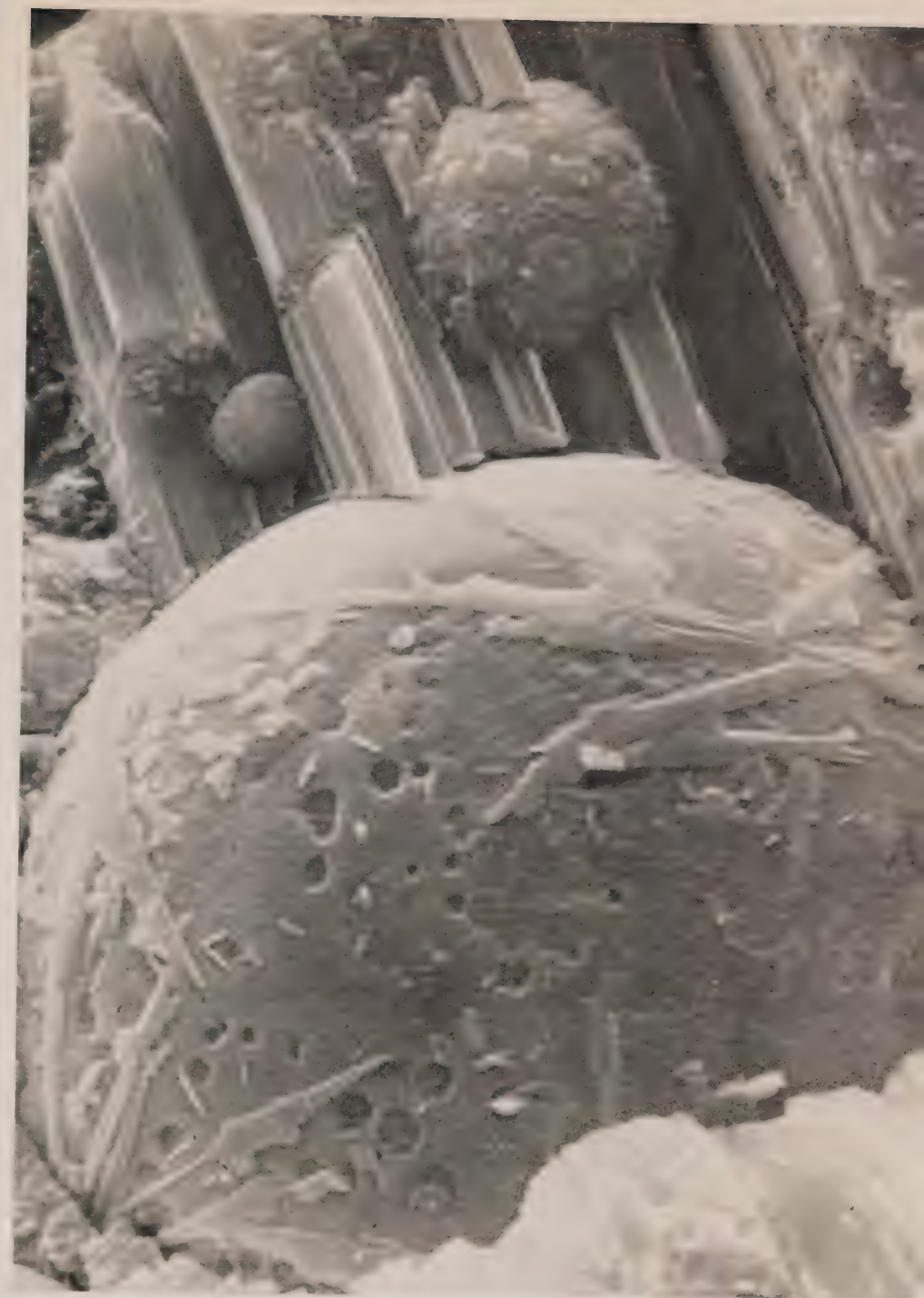
More sophisticated reclamation and recycling programs are being developed. In the US, for example, scientists have produced crude oil from domestic garbage. In Japan, solid wastes from municipal garbage are being compressed into building blocks. Another project is underway to convert coal into gas and liquid fuel to help ease the growing energy crisis, precipitated largely by more stringent controls on coal quality. There is also research into the reclamation of the many forms of plastics finding their way to the scrap heap and it's been suggested that some day this waste material will be used to fire thermal power plants.

Fly ash from coal-burning power stations, a major disposal problem, is being reclaimed and used as an aggregate for lightweight concrete. Ontario Hydro is involved in a major research project to help determine uses in construction and other fields.

Fly ash captured by precipitators at the Eglar power station near Toronto, for example, averages about 400,000 tons annually and costs about \$1 a ton to dispose of. If markets can be developed, considerable savings will materialize. In the US, fly ash has been used as an aggregate for fill in construction of Hydro's dams.

Ontario is also interested in the environmental effects of thermal discharges from power stations. While waste heat is described in some quarters as a pollutant, researchers are doing considerable work to help find useful applications for it.

The possibility of utilizing warm water from a station's condensers for fish hatcheries has evoked considerable interest throughout the world. Britain's Central Electricity Generating Board oper-



A microscopic view of fly ash. A residue from Hydro's coal-fired generating stations, it is becoming a valuable product as an aggregate for concrete. Photo was taken in connection with research by University of Toronto professor R. H. Mills on ways in which fly ash can be further utilized.

ates several such hatcheries. Warm water from power stations might also be used for swimming areas or even for heating cities.

Politicians are placing more and more emphasis on recycling and pollution control. Mayor John Lindsay, of New York, recently took a major step in this direction by announcing that specifications for a selected grade of office paper used by the city would require a 20 per cent content of recycled fibres.

"As far as we know this is the first action by an American authority. We intend to redesign our entire purchasing system to include a general preference for recycled products," he said.

In Ontario, a municipal waste disposal study conducted for the Ontario Municipal Council has recommended the development of a \$750,000 pilot plant for recycling of waste materials with particular emphasis on newspapers and glass bottles.



Crushed glass from 300,000 bottles was used as the main aggregate in the paving of this Scarborough street, top photo. Thousands of dead elm trees are being used at the Domtar kraft paper plant in Trenton to make corrugated material for cartons.

The report suggests that sufficient waste will be produced in Canada this year to build a four-lane highway, three feet deep, from Toronto to Vancouver.

"The first Canadian community to operate a reclamation system can expect to find itself a centre of interest for industries, governments and various technical organizations," says the study.

Coincident with its publication came the

launching of a community-spirited project in Burlington in the form of a reclamation station where residents can deposit paper, bottles, cans and other salvable materials for eventual transshipment back to primary producers.

While recycling of newspapers and other articles may be in the forefront, another use for yesterday's news has been suggested. Dr. David Dinius, at the Beltsville,

Maryland, Agriculture Research Center, claims newspapers can be blended with other ingredients to make a tasty meal for cows and other animals.

"A cow can polish off the equivalent of several 80-page journals a day, mixed with molasses, soybean meal and minerals," he says.

This article, incidentally, will self-destruct in 10 seconds.

A Physicist's Day



Thursday, February 25. It was really a physicist's day.

Billions of neutrons may split billions of protons, and a reactor starts up, yet who but a physicist can tell?

In fact, only a handful of other people witnessed the little drama played out in the main control room of the huge Pickering nuclear plant east of Toronto.

It began shortly before 10 a.m. with the painstaking business of raising the level of heavy water moderator in the Number 1 reactor.

As the level reached 200 centimetres, it was posted on a blackboard in the room set aside for onlookers. The control room panel was displayed on closed-circuit TV for the visitors. Further readings were chalked up as significant stages were reached and passed.

Between the 421 and 426 centimetre level, the physicists just aside their charts and slide rules. Nothing visible or audible had occurred, yet a chain reaction had been achieved.

Only a small quantity of heat was coming from the reactor, and no power. Various tests would be performed over the next five days and there'll be an extended period of testing, checking and further commissioning procedures before full power can be produced later this year.

It was truly a landmark in the progress of Pickering, which will ultimately see four 840,000-kilowatt units in service, but a little anti-climactic for all that. It was, after all, a day for the physicists.

King of the Castle

By Jean



Pellatt the Plunger had made his fortune before many people today are out of school.

was a time when young men could make their dreams come true. Not all succeeded, but one who did with flamboyant style was Henry Pellatt, a founder of the Toronto Electric Light Company, which was eventually absorbed by Toronto Hydro.

Of course, he is best remembered for the building of Casa Loma in Toronto in 1911. But Henry Pellatt was making and enjoying his fortune long before this, at an age when many today are still in school.

He had stiff competition in the money game from his American counterparts — Rockefeller, Gould, the Du Ponts and the Vanderbilts. With no income tax to deter them, most were equipped with an overpowering sense of acquisitiveness. And they liked to spend money like there was no tomorrow. Henry Pellatt gave parties at Casa Loma for 3,000 at a time — enough to give the modern host gooseflesh.

Pellatt made his fortune quite early. While still a youth, he travelled west on the recently completed Canadian Pacific Railway. On his return, he picked up shares in the company, formed to develop the west, when others regarded it as a poor investment. As settlers poured into the west, the stock rocketed, making Pellatt a profit of \$3 million to \$4 million. He next bought heavily into CPR and cleaned up a second time. Small wonder he was nicknamed "Pellatt the Plunger."

Toronto's most colorful entrepreneur came from an establishment background. He was born in Kingston in 1859 of English stock, and had to trace its ancestry back to 1230. The family soon moved to Toronto where his father formed a brokerage partnership with Sir Edmund Osler on Confederation Day, July 1, 1867, eleven years before the Toronto Stock Exchange was formed.

Henry entered his father's business at 17 after attending Upper Canada College. But the old school tie and stifling atmosphere of the bond business did nothing to drain his natural exuberance.

None of this he owed to being a superb athlete. While eventually taking part in many sports, he was most proud of having won the North American championship for

the one-mile race in 1879. But he had many other things going for him, as well. His interest in electricity superseded that of

his contemporaries, who regarded it as the newest scientific miracle but did not realize its commercial potential.



Casa Loma's Great Hall still exudes an atmosphere of baronial splendor

Although warned by an uncle in England to put no money into such a hairbrained scheme, he went ahead with the formation of the Toronto Electric Light Company. His first contract was for 32 arc lights in the downtown area, a seemingly modest proposal. But it was difficult to get the conservative people of Toronto to accept the new-fangled lighting. Many said the lights were a grave danger to horses and driver. Things got so bad that a meeting of council was called to discuss the issue. Henry Pellatt and his company won because the city doubled its order for lights and let the horses fall where they may.

At first, the electricity for the street lighting was generated from coal – a half ton being used per night. But Pellatt had other ideas. He had seen the Americans harnessing power from Niagara Falls. Determined to build an electrical power plant on the Canadian side, he went to England to float a \$10,000,000 bond issue. English money combined with Canadian to form the Electrical Development Company, a syndicate headed by Pellatt, William Mackenzie, the railroad builder, and Frederic Nicholls. The company was bought out by Ontario Hydro in 1920. In the meantime, the enterprise prospered and Pellatt was knighted in 1902 for his contribution to electricity's commercial development.

However, it was never all work and no play for Pellatt. He brought the first 52-inch bicycle into the country from England and was the owner of the first electric automobile in Toronto, which worked so erratically he was frequently seen being pushed from place to place.

His true love, though, was the Queen's Own Rifles. Since he was a crack pistol shot and true blue patriot, it was natural that he should join the regiment at 17. Although his only active service was experienced when he was sent to put down a riot at Belleville on New Year's Day, 1877, he devoted over 50 years to the regiment, rising from private to major-general.

In 1902, the now Lieutenant-Colonel Pellatt was ordered to take 600 men to London to participate in the coronation ceremonies of King Edward VII. In one of the flamboyant acts which were to mark his life, he decided to take an entire military band along at his personal expense. The Canadian contingent was the talk of the coronation ceremonies.

The British were again to be impressed in 1910 when Sir Henry's grand gesture was to take 670 members of the Queen's Own to British army manoeuvres at Aldershot. This time he paid all transportation costs plus maintenance of the regiment for several weeks.

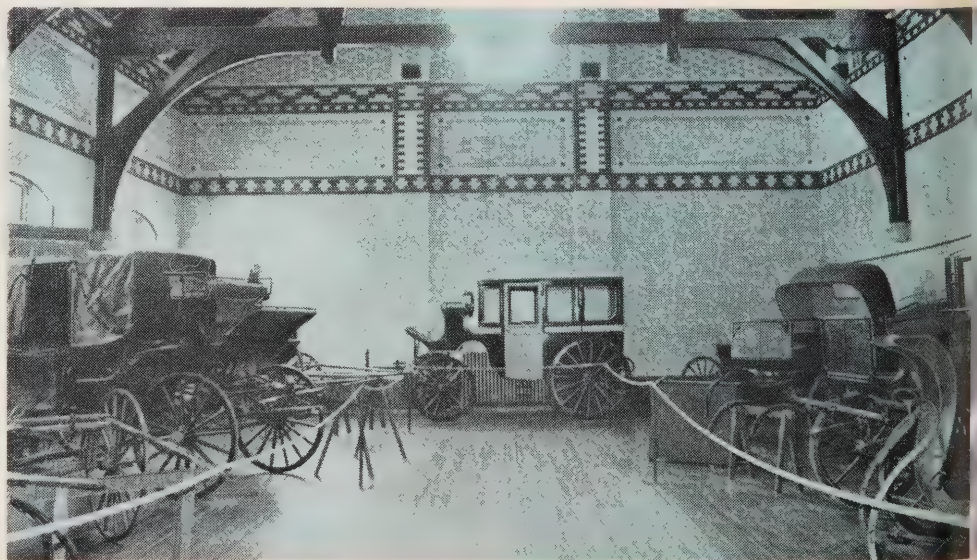


In his book "Toronto," Bruce West says: "Toronto was awed, Imperialists were delighted, Britain was thrilled at this grand gesture of Canadian loyalty at a time when the shadows of the coming First World War were already lengthening across Europe."

Back on the farmlands of Toronto on land acquired in the Wells Hill area, the "Plunger" was getting ready to pull his greatest exploit. Originally, the multimillionaire had merely planned a real estate development.

But then he hit upon a much more dramatic idea to create a distinctive tone for the district. This tied in with his ever-present dream of one day entertaining royalty in his own home.

The two schemes culminated in the building of Casa Loma between 1911 and 1919 – "a mixture of 17th Century Scottish Baronial and 20th Century Fox," according to one description." By any classification the castle is certainly unique. Built on massive foundations to support its turre



Sir Henry Pellatt's fine collection of tropical plants and flowers was nurtured in the Casa Loma conservatory.



ers and battlements at a cost of \$60,000, it could not be duplicated for \$60,000,000. For openers, it has 98 rooms, three bowling alleys, 25 fireplaces, 52 telephones, a floor marble swimming pool and is more elegant than many a modern

ones complete with secret passages connecting Sir Henry's main floor study to the second floor and basement recreation room. Push a panel in his bedroom and a secret compartment reveals itself: a perfect place to keep important papers. By this time Sir Henry, who was a partner in many leading companies, must have amassed quite a few.

Casa Loma also incorporated all the latest electrical equipment. The first type of electric lighting was fitted into the elegantly decorated ceilings. There was an electric fan for his wife, who was a semi-

invalid. A refrigeration system kept Sir Henry's 1,500 bottles of wine at the correct temperature.

Sir Henry did achieve the first part of his plan. Casa Loma created prestige for the Wells Hill development, making a profit of at least \$1,000,000 on what the castle had cost. And contrary to popular belief, he did not end up a bankrupt.

It was merely the fact that he was to find living in the castle not what he had expected. Although he entertained lavishly, often having the whole regiment quartered in the basement for the week-end, he never realized his wish of entertaining royalty. A small consolation must have been the breakfast room furniture, donated by "some member of the Royal family."

By the twenties, taxes unheard of in Sir Henry's heyday were killing him. In 1920, taxes on the estate were \$12,000 although they had been estimated at \$600 in the blueprint stage. The now common servant problem had developed; too few and costing too much. By 1924, he decided to move out to his farm at King, Ontario. The most fashionable auction of the day was to carry off his \$500,000 worth of prized furniture, paintings and sculpture. "It's a sale to break my heart," he commented sadly to the press.

Sir Henry died in 1939, two months after a testimonial dinner was given on his eightieth birthday at which a few of the original members of the Queen's Own bugle band were in attendance as they had been at Edward's coronation 37 years before.

His fine collection of arms and armour was donated to the Royal Ontario Museum. Ironically, it had been Sir Henry's wish that Casa Loma be used as a military museum after his death. The ground floor was constructed of reinforced concrete to support the heaviest military equipment.

The city, which had to take over what was to be the "white elephant" of Toronto, saw no way to do this. An attempt was made to use it as a luxury hotel, but this soon faded during the dark days of the Depression. During the Second World War, Casa Loma's stables and carriage house were used by a local company turning out top-secret sonic devices to detect U-boats.

But the destiny of Casa Loma was that of a tourist attraction. In 1937, the Kiwanis Club of West Toronto rescued the castle and have made it a paying proposition, donating over \$1,500,000 to charity raised from tours and dances. Their agreement with the city expires in 1977. The property is now worth \$4,000,000, or \$6,000,000 if the zoning were to be changed to permit the building of apartments.

While the Kiwanis Club have gradually refurnished some of the rooms, until recently the third floor remained empty. Now it has been turned over to the Queen's Own for use as a military museum.

At long last, Sir Henry Pellatt can rest peacefully in his grave, with memorabilia from his beloved regiment ensconced in his castle.

European craftsmen toiled for three years to install oak panels in Sir Henry's drawing room, while the garage is more than today's standard two-car affair.





Canaries With Gout?



By David Huxford

It's a fact. And today's animal hospitals must be prepared for everything from an ailing hamster to an iguana with a broken leg.

ong, extremely straight white-blond
tumbles over his forehead, almost
aking the exceptionally dark brown eyes
seem to grow even wider with the
al of every new patient.

blond locks contrast sharply with
black part-Persian cat straddling his lap
the black-and-tan dachshund huddled
e by.

around three-and-a-half, his cat is
at a year older and the dog's close to
years younger. And, like the gentle-
who just arrived with a huge Irish
ound, or the woman who followed
e behind carrying a cage housing an
hamster, he's an animal lover.

All three typify millions of North Americans whose love for their pets has made small animal practice a rapidly expanding segment of the veterinary medicine profession.

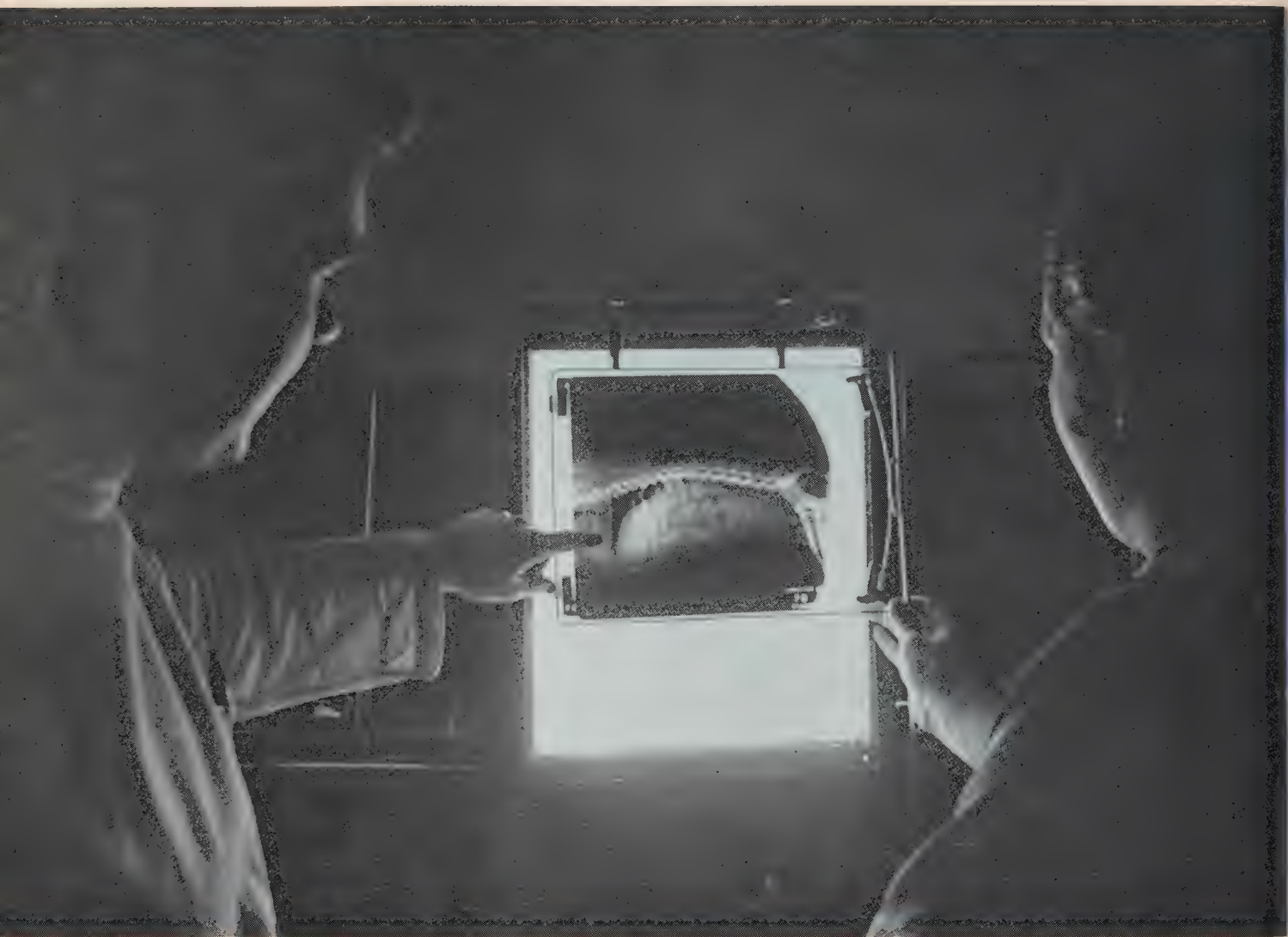
Amherst Veterinary Hospital is typical of the pet clinics in larger centres across the nation. These establishments are exactly what their names imply — hospitals for ailing animals with services offered by the doctors who run them ranging from simple toe nail trimming to delicate open-heart surgery.

And with the growth of the pet population outstripping human population growth by a wide margin, the day of specialization in the field of veterinary medicine won't be too long in coming.

Matter of fact, at Amherst Dr. Blake Graham is already leaning toward ophthalmology and feline diseases while his partner, Dr. Richard Ketchell, is interested in orthopedics and radiology. Another doctor tends to specialize in bird diseases — many of them suffer from hormonal, intestinal and skin disorders or gout — while a fourth looks forward to the day when even more diagnostic heart equipment arrives at the hospital.

But all veterinarians, regardless of their specialty, must play a variety of roles. Dr. Graham, for example, is likely to be attired in his green operating gown, a white cap covering his hair. A white mask, with the strings hooked around his ears, protects the

Modern X-ray equipment reveals an arthritic condition in the spine of a German shepherd.



patient from bacteria which could escape from his nose or mouth.

Marjorie Underwood, Reg. N., takes up a position at the head of the operating table — it's similar to the one used in human hospitals only smaller — to administer the anesthetic. She uses a similar machine to the one found in a human operating theatre and it maintains the level of unconsciousness with the same gas that keeps humans "under" during surgery.

Dr. Graham's performing an ovario hysterectomy — to the uninitiated that's spaying. The patient, a five-month-old Boston terrier, is covered by a green laparotomy sheet. It's a 45-minute opera-

tion and, because the patient is young and healthy, pretty routine. Dr. Graham has a few minutes between glances at the electronic cardiac monitor and removal of the ovaries to chat about the procedure.

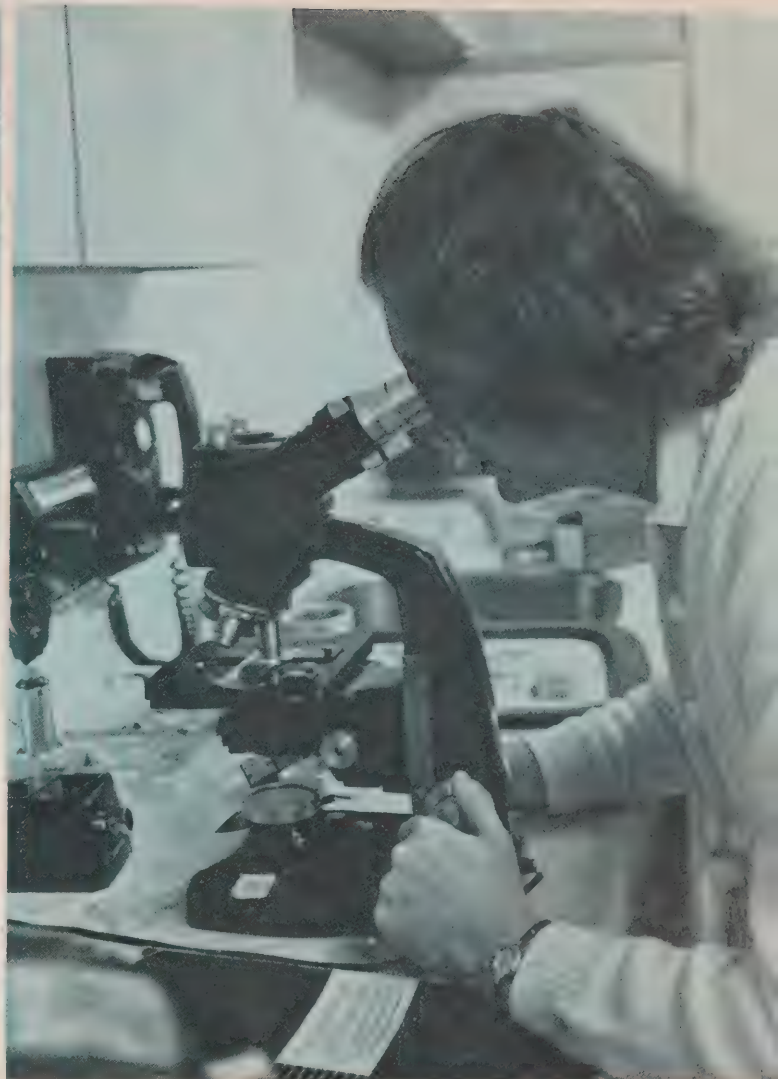
"There's quite a distinction between a dog and a woman — most dogs are done when they're young and healthy. Really, there's no psychological effect on a canine whereas an hysterectomy can play havoc with some women.

"I'm going to install three rows of sutures, just like they do in human abdominal surgery. I have to close the peritoneum first — that's the inner lining of the abdomen. Failure to close it would result in a hernia.

"Next, I'll close the fascia and muscles and lastly the skin. We have to have a pretty strong closure in an animal because the position created by walking on four legs causes everything to drop toward the incision. That's really the trick — to get the stitches in tight enough to defeat the force of gravity. We use a surgeon's knot, sort of like a reef knot with an extra tie."

As he talks about anesthetics, Dr. Graham mentions the machine that administers the gas. "It's the same one they use in most general hospitals, with a built-in respirometer. This little gadget — it measures exactly the millilitres of air an animal breathes in a second — is worth about \$300. But it's particularly useful

Dr. Blake Graham closes the abdominal cavity of a five-month-old Boston terrier as Nurse Marjorie Underwood adjusts the hospital's electronic cardiac monitor. Mrs. Underwood also doubles as a lab technician to investigate disease-causing bacteria in animals.



chest surgery to gauge the amount of the patient will take in by itself and much will be required to make up the shortage."

In the treatment room, another veterinarian is busy treating a canary — the bird suffering from malnutrition and the medicine he uses costs \$22. It's extremely expensive, calibrated in micro-litres, and very delicate. At the far end of the room, a veterinarian is doing some dentistry — dogs must have their teeth scaled to rid them of plaque accumulations.

Animals arrive with shell problems and every day and then there'll be an iguana with a broken leg. Nearly all drugs used in the veterinary hospital are the same as those used in human medicine.

X-ray equipment used in an animal hospital can be found in any general hospital. In fact, all the gadgetry like electro-surgical units, optic viewing systems which improve the use of scopes for peering into body cavities, and instrument sterilizing equipment is precisely the same as that used in a general hospital and forms part of the lucrative hospital equipment supply business.

Actually, about half the practitioners of veterinary medicine in the nation are involved with large animals, such as cattle and sheep, and in the food production and protection industry. Some are strictly equine practitioners and many are absorbed by the federal Department of Agriculture's

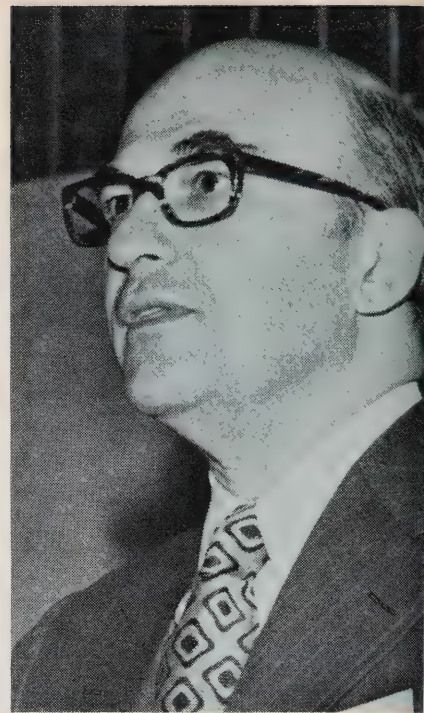
Health of Animals branch. Others accept positions in research institutions, their job being to care for laboratory animals.

But the arrival of a veterinary ambulatory service carrying a distraught female Boston terrier who can't give birth unaided makes the tiny small animal clinic just like a busy general hospital. There's always a highly competent medical staff available to handle any emergency.

straight talk

usually marks the annual convention of the OMEA and AMEU. And this year was no exception as delegates dwelt on a number of controversial topics from fuels to finance.

Alex Radin



Need for continental energy policy

An American utility executive attacked the growing concentration of ownership in the energy industry and emphasized the need for a continental energy policy.

Alex Radin, general manager of the American Public Power Association, said that industrial conglomerates are responsible for the bulk of the energy output in North America and this could lead to price manipulation.

Noting that the U.S. is moving toward the establishment of a national energy policy, Mr. Radin said: "Some have stated that it makes good social sense to plan energy development and use it on a continent-wide, if not planetary basis, and I see merit in this approach.

"As the United States moves toward the development of an energy policy, I would hope that this would be done in consultation and co-operation with our neighbors on this continent. Nothing could be more important to the future well-being of the people of this continent, because it seems inevitable that there will be continuing need for greater supplies of energy."

Referring to the rising prices for fuel, Mr. Radin said: "The President's Council of Economic Advisors reported that during the first six months of last year the price of bituminous coal had risen at an annual rate of 56 per cent, and the price of residual fuel oil had increased at an annual rate of 47.6 per cent.

"Some of the municipally-owned utilities in New England, however, have reported to us that the price they have been paying for residual fuel oil has risen by as much as 275 per cent in the past year," Mr. Radin said. "Some coal prices have increased by as much as 100 per cent."

He said the crisis has been more serious for the publicly-owned utilities than those that are privately-owned. This could lead to a lessening of competition in the U.S. electric utility industry by rendering uneconomic the smaller generating stations of the public systems, forcing them to rely on private companies for their bulk power requirements.

The APPA official pointed out that eight of the 10 largest coal companies in the U.S., accounting for almost half the nation's coal production, are now owned either by oil companies or industrial conglomerates.

In addition, half the new uranium strikes in 1968 were made by uranium companies owned by the oil industry and nearly half the uranium-producing capacity is owned by the oil companies. Because natural gas and petroleum are usually discovered in the same areas, most oil and gas companies have long been under the same ownership, he said.

"Our association has been particularly concerned about this trend toward concentration of ownership in the entire energy industry, because we believe that it holds the potential for manipulation of prices and supply that would be detrimental to the interests of the nation's energy consumers,

and to the general public interest," Mr. Radin added.

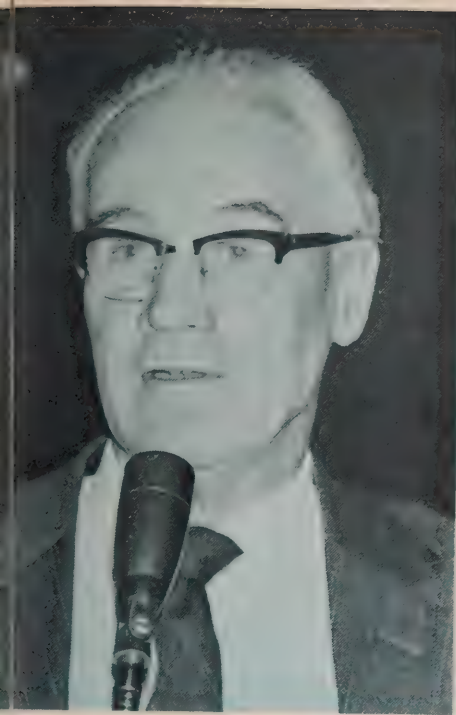
He said the lack of a national energy policy may have been tolerable as long as the aggregate demand for energy was not so stupendous, or as long as supply seemed infinite, "but it is becoming of that our nation can no longer rely on such an ad hoc, industry-oriented policy."

Environmental controls were also becoming more and more important and must be taken into account in the establishment of utility rates, the speaker said. Other factors such as the cost of interest on investment, labor costs and equipment costs for generation and distribution were adding to the burden on utilities.

Mr. Radin said the most important single factor pressuring power rates in the United States is the rising price of fuel, which accounts for 35 per cent of operation and maintenance costs.

He suggested that this pressure make imperative that the electric utilities do a better job than ever before, both in planning and operation.

"We must develop far better mechanisms for planning than now exist, particularly inter-regional planning — so that we maximize the use of resources and take a better account of environmental considerations." □



Dr. Hay

Stick plan decrease borrowing

Ontario Hydro proposals to alleviate the high cost of borrowing funds for its large capital construction program were endorsed by OMEA delegates.

In the final resolutions session, delegates adopted a Sarnia resolution which would defer the implementation of the new accounting procedures until 1974.

The proposals involve changing the procedure of making provision for depreciation of plant and equipment from the present sinking fund method to the straight line method and shortening the term of the sinking fund for debt retirement from 30 years to 30 years.

Under the straight line method, the annual provision for depreciation is spread evenly over the 30-year life of an asset instead of increasing. For example, \$33.30 would be set aside annually for each \$1,000 of asset value. Under the sinking fund plan, the amount gradually builds up from about \$20 to about \$50 over this period.

Robert Hay, power costing committee chairman, said the reason for the proposed changes is to provide some additional capital for Ontario Hydro by raising more funds internally to reduce borrowing at high interest rates.

If more funds are raised internally, he said, the wholesale cost of power will be "less" than it would be if high interest

rates had to be paid for this amount by issuing bonds.

He said the effect of the changes on the wholesale cost of power to utilities would be an additional 90 cents a kilowatt in 1971.

"Let me assure the meeting there will eventually be a real saving although there will be a slight increase in the cost of power at this time," said Dr. Hay.

Ruth Donohue, of Sarnia Hydro, was the only delegate to speak in favor of her utility's resolution.

Andrew Frame, resolutions committee chairman, said delay in implementing the proposal would eventually lead to greater cost increases and would be "poor business".

Thumbs down on grants-in-aid

A resolution calling for resumption of government grants-in-aid to newly-created utilities and regional Hydro systems in Southern Ontario was heavily defeated.

The proposal, opposed by the resolutions committee as setting a "dangerous precedent," said grants-in-aid should be re-established in Southern Ontario "where recently-created commissions or regional Hydro systems are forced to service unprofitable customers." It also asked the government to make capital grants to any commission created since 1958 which has been required to service rural customers.

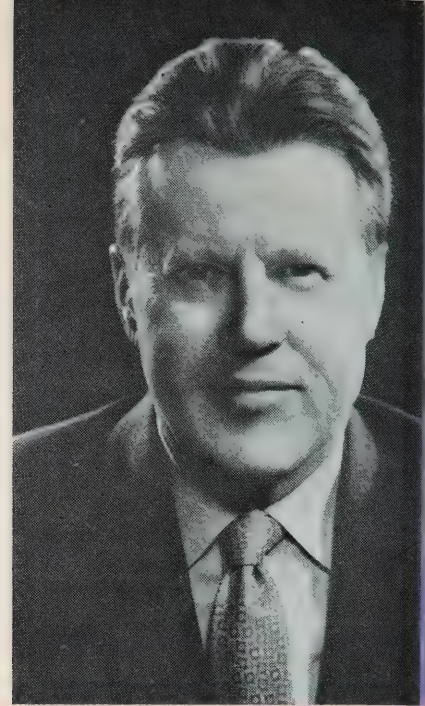
Grants-in-aid were discontinued in Southern Ontario in 1958, but the provincial government still pays up to 50 per cent of the capital cost of extending rural distribution systems in sparsely-populated Northern Ontario. This grant-in-aid was used to assist in the formation of the Thunder Bay Hydro from the Port Arthur and Fort William utilities and part of the adjacent area.

Andrew Frame, of Burlington, said the Thunder Bay grant was a "gift" from the government and pointed out that such grants are usually repaid to the government.

Hugh McDonald, of Nepean Township, who moved the resolution, said such grants would help new regional municipalities like Ottawa. He estimated that the grant would amount to about 20 per cent of the assets to be acquired from Ontario Hydro.

An amendment proposed by Anthony Green, of Oakville, which would ask the province merely to consider such grants when recently created utilities "are forced to service unprofitable customers," was defeated. Several delegates questioned what was meant by "unprofitable customers".

Dr. Robert Hay, of Kingston, opposed the resolution on the grounds that asking the government for financial assistance would open the door to interference in the utility business. "It would be like putting our heads in the lion's mouth . . . and this time the lion might close his mouth."



George Gathercole

Gathercole defends marketing policy

Ontario Hydro Chairman George Gathercole defended what he called "the basic correctness of an active marketing program for Hydro." But he added that promotional programs for the seventies might be examined to determine whether the approach of the past decade could be improved upon.

Mr. Gathercole said he was constantly being called upon by businessmen, legislators and even utility commissioners to answer the question of why Hydro should continue to advertise and promote its product.

Critics were pointing to statements by Charles Luce, chairman of Consolidated Edison in New York, who suggested that large electrical consumers be penalized and that power be rationed.

"I can only say that if I had the problems of the chairman of Consolidated Edison, I would probably be suggesting the same thing. But these attitudes do not reflect a desire to restrict growth. They arise directly and solely from the threat of fuel and power shortages, of not being able to serve customer demand."

Mr. Gathercole added that the marketing program pursued in Ontario was designed to serve the best interest of hydro customers when it was started in the 1950's. Without it, rates would have been considerably higher.

"I need hardly remind this audience that one of the principal benefits of marketing arises from the economic equation of spreading fixed costs over a wider base with the result being a salutary effect on unit or kilowatt-hour costs.

"The purpose is to use our generating plants and transmission and distribution facilities more effectively by filling in the valleys between peaks or highs in demand. Our industry is capital intensive. Once the plant and distribution system have been constructed, the more kilowatt-hours that can be supplied, the lower the unit cost."

Mr. Gathercole referred to suggestions that marketing emphasis be placed on helping the customer to get more out of a kilowatt-hour of electricity.

"Encouraging more efficient consumption could complement the more traditional aim of simply enlarging use. It would be no less effective in maintaining our competitive position," he said.

"In an era of capital shortage and high interest rates, of determining environmental quality, and of increasing consumer and social awareness, the pursuit of unplanned growth in consumption may well prove to be counterproductive.

"To emphasize efficiency or quality of use, as opposed to quantity, may be more in keeping with the goals of the people we serve. I believe this subject is worthy of the fullest consideration by your associations," he told delegates.

The chairman said that energy, particularly electric energy, is the heart of 20th century

life and to think the trend is otherwise is to ignore reality.

Mr. Gathercole was critical of environmentalists who have charged that Hydro expansion should be curtailed as or more of cutting down on pollution.

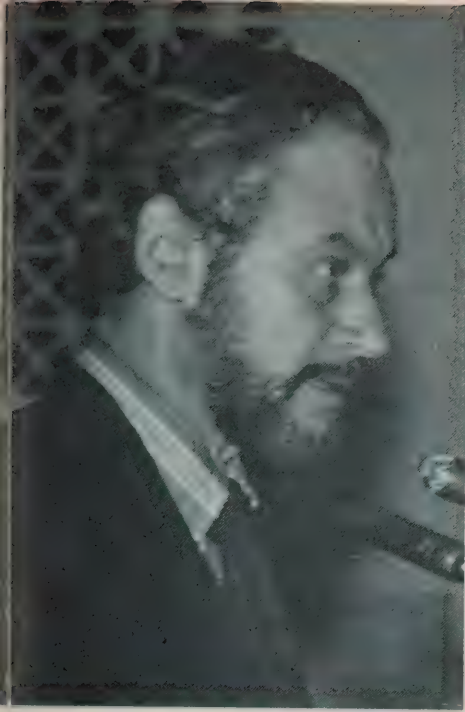
"The theory goes like this," he said. "People pollute and more people mean more pollution.

"Electric power facilitates growth, therefore an effective way to keep the number of the nation empty is to restrict electricity expansion.

"The theory is great, except it doesn't seem to work. Countries with the lowest electrical consumption and the poorest living standards generally have the highest birth rate. In our age, the absence of electricity seems more likely to stimulate reproduction rather than curb it."

Mr. Gathercole said that the efficient and highly-controlled consumption of fossil fuels in the electric power production process represents the most advanced use of these fuels from an environmental viewpoint.

"As I have said, all the evidence suggests that modern society will use more electricity, not less, and efforts to restrict use will be environmentally self-defeating."



Peter Allen

Levies to wipe out debt?

OMEA delegates were urged to "take a good hard look" at the possibility of additional levies tacked on to the cost of power which would eventually eliminate Ontario Hydro's indebtedness.

R. H. Hay, of Kingston, the association's power costing committee chairman, suggested the OMEA could adopt a new policy which would raise small, but steadily increasing amounts of new capital apart of the cost of power and eventually eliminate Ontario Hydro's debt.

Hay said Hydro's current debt is about \$300 million. Estimated borrowing for 1971 is around \$446 million. "If the utilities accepted a capital levy of 1 per cent as part of the cost of power in 1971, Hydro's growing would be reduced by \$33 million.

The benefit would come next year and every year thereafter in reduced interest and debt retirement charges," Dr. Hay pointed out.

He suggested the levy could be increased one percentage point every year until, at the 11th year, it would just equal the amount of new capital required. The debt, he said, will then have been stabilized and will start to decrease automatically because of the debt retirement sinking fund.

He suggested the increasing capital levy would raise the unit cost of electrical energy to the municipalities gradually so

that at the fifth or sixth year the cost would be about 30 or 35 per cent over the present projected costs. After that, the increase would start to shrink.

"After 16 or 17 years, a real benefit should accrue from the reduction of interest payments and debt retirement payments," Dr. Hay said.

"The question is — how much are we prepared to pay to be, beyond any shadow of a doubt, masters in our own house? I feel we had better have a good answer to that question right soon," Dr. Hay added.

Unite to end whip-sawing

There's a real danger that union negotiations throughout Ontario's construction industry this spring will precipitate an economic crisis, said Peter M. Allen, executive vice-president of the Ontario Federation of Construction Associations.

Mr. Allen told delegates that Ontario currently accounts for almost one-half of the construction dollars spent in Canada, representing up to 10 per cent of the Gross National Product.

Construction wages, he said, are the highest in the land and are increasing at a rapid rate. And these increases are so large, disproportionate and inflationary that it appears contractors are running a "give-away game."

"This is far from the truth. Today, in Ontario, a contractor who employs organized labor can be forced out of business

unless he accedes to union demands. Since most contractors are small businessmen, their own financial resources are quite limited and after a short period of closure by striking employees they face the bitter choice of either bankruptcy or capitulation to union demands. After capitulation to monetary demands, further concessions follow which enable the unions to exert continuing control over the contractor's operations," Mr. Allen said.

He added that unions learned long ago, through bitter experience, that strength comes from unity. They learned how to support each other in the clinches, even if they really didn't like each other. "Contractors, on the other hand, are only now beginning to accept this truth."

Mr. Allen warned delegates that what has happened in construction could easily happen in the utility industry. "Unless there is a united front, co-ordinated bargaining and common objectives among all utilities, the unions will whip-saw you to death."

meet the new president

Andrew F

Man of action with a story to tell

"I like to be where the action is," says Andrew (Andy) Frame, and as the new president of the Ontario Municipal Electric Association he should get his wish.

On the sunny side of middle age, the outspoken Hydro commissioner from Burlington finds himself at the helm of an association which is coming to grips with a problem that will influence the future course of electrical distribution in the province — the provision of electrical service under a regional government setup.

Tracing its origin back to 1912 — just six years after the birth of Ontario Hydro and the advent of the power-at-cost principle in Ontario — the OMEA represents the policy-making arm of some 350 municipal utilities across the province. All but a handful of these commissioners are elected by the people of the local municipalities.

A man of convictions, Mr. Frame is particularly sold on the concept that electrical distribution is best handled at the local level and that the unique Ontario system, with its elected commissioners to ensure local involvement, remains in the best interest of the electrical customers.

"Fifty years ago everybody knew the story of Hydro and how the municipalities took the lead to ensure power at cost for the province," Mr. Frame points out. "Two generations have passed since then and the story needs retelling because the system is worth retaining. It put the province out

in front electrically and it's keeping us there."

The new OMEA president brings a nice balance of enthusiasm, expertise and experience to the job.

Born in Toronto, he won his B.Sc. in electrical engineering from the University of Toronto in 1951. Convinced that business training and technical know-how were sound bedmates, he then commenced a six-year stint of night and weekend studies divided between his alma mater and McMaster which led to a Master of Business Administration in 1957. During part of the process, he earned his bread and butter at Canadian Westinghouse, Hamilton, where he completed a graduate training program.

Mr. Frame joined English Electric of Canada in 1953 and his close association with the municipal Hydro systems began. As a district sales engineer handling distribution transformers and substation equipment throughout the Niagara district and Southwestern Ontario for several years, he got to know many of the people he now represents as OMEA president.

Parallel with his career at the manufacturing level, Mr. Frame was demonstrating his own involvement with the community at home in Burlington. He was elected to the local public utilities commission in 1957 and he is presently commencing his 14th consecutive year in this capacity.

Extending his range of interest to the provincial municipal electric field, Andy Frame became active at the association level and his views have been put forward

regularly on the floor of district OMEA conventions and at the annual meetings of parent association. He has been a director of District 5 for three years and was president in 1969. He has been a member of the joint OMEA-AMEU Public Relations Committee since its inception.

On the home front, the new OMEA president shares the leadership with his wife Joan, two sons and a teenage daughter. Their playground is the whole outdoors and their interests range from sailing and swimming to camping and skiing.

Mr. Frame commutes regularly from his Burlington home to his office in Rexdale near the Toronto International Airport. As a technical manager with Farrel Car Limited, machinery manufacturers for the rubber and plastics industry, he's a regular customer of the airlines and finds himself up in the air almost every week.

He's very down-to-earth, though, in his approach to OMEA affairs and one of the problems he hopes to see cleared up during his tenure as president is the uncertainty which beclouds the municipal Hydro system as it relates to regional government.

"I know that the uncertainty which exists in my own District 5 is having an adverse effect on Hydro progress," he explains, "and I fully endorse the stand taken by the association regarding Hydro administration under the newly-formed Niagara regional government. In essence, this includes a reduction in the number of municipal utilities from 11 to seven and some adjustment of the system serving rural customers."



Tony Furanna

frame is hopeful that this kind of re-
tirement, with elected Hydro commis-
sioners serving on a lower tier basis, will
be the pattern for electrical distribution
at the regional government.

"I fully believe the people want close ties
with the government and other agencies
providing them with essential services. We
are not prepared for a system wherein a
single utility would serve an entire region."

and a man who's wearing many hats

Spoken and mild-mannered he may
be, but the man who takes over the reins of
the Association of Municipal Electrical
Utilities is bound to make his impact felt
within 12 months that he will guide its
future.

Tony Louis Furanna — his friends call
him Tony — has worn many hats in his
career. As London PUC's general man-
ager, he's overseen the efficient operation
of the city's electrical distribution system,
supply of water, its parks and recreation
department and for a time ran a railroad.
He died the London and Port Stanley
for many years, but we lost it in 1965
when the decision was made to sell it to
the Canadian National. Mr. Furanna says
he casts a nostalgic glance over his
picture toward the framed picture of a
photograph on the wall of his modest
second-floor office in London's PUC
building.

A 1939 graduate in electrical engineering
from Queen's University, Tony Furanna has
pretty definite ideas on the direction

the AMEU should follow. Training and
retraining is one of them.

"Our training program is moving along well,
and I want to see it stay that way. Up-
dating the skills of our employees is a field
I feel we have to pursue, for utility re-
quirements are changing almost con-
tinuously.

"But, I do not want to see training for
training's sake alone. I want to see this
association fulfill the needs of the munici-
pal utilities. There are certain staple trades,
such as lineman, where updating of tech-
niques is becoming necessary, what with
underground construction and mainte-
nance being relatively new and higher
distribution voltages coming into use."

He mentions the AMEU's marketing train-
ing program and the office administration
practice courses and supervisory training
courses as also fulfilling utility needs.

Mr. Furanna is a firm believer that electrical
utilities should be involved in marketing
in a big way. "It's only through marketing
that utilities can keep the price of elec-
tricity at economic levels. The cost of
power bought from Ontario Hydro repre-
sents between 60 and 75 per cent of the
total cost of an electrical utility's opera-
tion."

About the criticism of Hydro's promotional
efforts, Mr. Furanna says he doesn't think
fear of pollution is any reason to restrict
the use of electricity — "in fact, it holds out
the best hope of abating pollution."

Tony Furanna began his career with Lon-
don PUC in 1940, although he'd already

worked there for five summers as a student.
When he started as a junior engineer, the
peak demand was 30,000 kilowatts and
the utility's assets totalled \$6.6 million.
Now the peak demand is pushing 235,000
kilowatts and the assets are about \$45
million.

Not long after starting with the PUC, Mr.
Furanna entered the army, but his military
career was short-lived. "I was on the way
to Halifax with the RCME Corps — had
one foot on the train step, in fact — when
they reverted me to civilian life. They made
me an instrument engineer with Spartan of
Canada, a subsidiary of the Federal War
Production Agency."

Back at the PUC, he worked in the engi-
neering department, was named chief
engineer in 1952, assistant general man-
ager four years later and general manager
in 1964.

"It's always been an ambition of mine to
head the AMEU. In my opinion, it's one of
the most important jobs in the Hydro
family. I think every utility manager in the
province should have this same desire.
That's the way to keep the association
functioning at the high level it now en-
joys," he says.

Somehow it seems fitting that London
PUC, which in 1902 as the Board of Water
Commissioners had a commissioner named
Adam Beck, should this year have its
general manager at the helm of one of the
province's most important electrical
organizations. Not only that, Tony Furanna
is the third general manager from London
PUC to head the AMEU.

along hydro lines



J. D. Phillips

Back last October, just about everyone in Schreiber turned out at a town hall banquet to bid farewell to J. D. (Jack) Phillips, who earlier in the year had announced his retirement from public service and closed the door on a career that spanned close to 40 years.

It was Jack Phillips' second retirement. His first was in 1955 from the CPR after having served in every executive office of the Brotherhood of Locomotive Firemen and Enginemen.

The townsfolk were out in force again at the end of February, but it was a sad occasion. Mr. Phillips had died in Toronto — just a few days before he was due to receive a life membership in the OMEA. At the funeral service, the Rev. E. C. Prinselaar said Mr. Phillips would long be remembered in Schreiber — perhaps every time a light was turned on or electric power was used in any form, since it was during his term as reeve in 1948 that electricity was first supplied to the community through Ontario Hydro.

Long after leaving municipal politics, Mr. Phillips, a member of Schreiber's first Hydro commission as the town's reeve, maintained his interest in electrical supply in this northwestern Ontario community, staying on the commission until his retirement last year. He was a former president of District 3 of the OMEA. □

Practices what he preaches

Burk's Falls reeve J. Stanley Darling is a man who practices what he preaches. As a member of the village PUC since its inception 20 years ago, Mr. Darling has been preaching the electric heating gospel to just about everyone who builds anything in the area.

And he's a firm believer in the product. He had the first Gold Medallion home for miles around when it was built 12 years ago.

When a new building was erected in the village to house a branch of the Royal Bank of Canada, Mr. Darling, a real estate broker, successfully campaigned for it to be electrically-heated. Now he's just completed a modern office building — the Stan Darling Block. It's all-electric, naturally. □

Engineering granddad

Plans are in hand around the world to commemorate the centenary of the oldest of all electrical engineering associations, the Institution of Electrical Engineers.

In the UK, plans include a technological congress with the theme "Electrical Science and Engineering in the Greater Service of Man." Eight lectures will be delivered by eminent scientists and engineers from Britain and overseas, including three from the US and Canada.

Opening ceremonies will be held at the Royal Festival Hall on

May 17, preceded by a commemorative service at Westminster Abbey. In addition to a dinner at the House of Commons and a Guildhall banquet, the social highlight will be a conversation at the Festival Hall on May 19.

In Toronto, the IEE has reserved space at the Ontario Science Centre on May 19 for a dinner, lecture and a short conversation.

IEE president Lord Nelson of Stafford will be among speakers at the science centre and the lecture will be delivered by Dr. W. B. Lewis, senior vice-president, science, of Atomic Energy of Canada Limited.

Priceless packages

Pea-sized lamp bulbs and cumbersome old generators were valued at the same amount — priceless — as they were loaded to a caravan of flat-bottom tandem trucks.

It was moving day for the collection of electrical artifacts from a building at the Ontario Hydro Service Centre in Etobicoke to a new home on Advance Road, a few hundred yards away. Mr. Phillips hopes the collection will eventually provide an over-all record of the development of electricity past and present with even a glimpse into the future.

The collection includes items from all over the world, almost everything in it donated by firms and individuals who were interested in seeing electrical history preserved. The A. J. Plumptre lamp collection, for example, is probably the finest in the world. It is named for the late Hydro pensioner who devoted several years to identifying and collating the thousands of lamps.

Ontario's municipal utilities have been generous contributors to the collection. In fact, the suggestion that Hydro should form a historical collection was raised by Lt. Col. A. A. Kennedy, an Ontario Hydro commissioner, when he was president of the OMEA.



Moving day

Said R. M. Fraser, vice-president of C. A. Fraser Limited, the firm which handled the move: "Insurance isn't the point in handling this kind of thing. These items are priceless and irreplaceable and just must not be damaged."

Somehow it seems incongruous to think of items such as an old cast iron stove bearing a placard which reads: "Stove and Up from The Hydro Shop, 226 Yonge Street" as now priceless.

But their true value isn't something that's measured in dollars.

How sweet revenge?

It took many years, but the boys in Ontario's elementary and secondary schools finally got their revenge. They took seven of the nine top places, including three firsts, in the provincial speaking finals in Toronto earlier this month. And half of the contestants were girls!

the provincial contest, representing the best young orators of about 400,000 eligible students across Ontario, are co-sponsored by Ontario Hydro and the Ontario Public School Teachers' Association.

Last year, five of the nine winners were girls, including two of the top three. In other years, the girls have also done extremely



for smiles

At this 45th competition, the winners were Jeffery Rawsthorne, of St. Catharines, seen accepting his trophy from Ontario First Vice-Chairman R. J. Boyer, Graeme Arbuckle, 17, of Ridge, left, winner of the secondary school impromptu speech, and Steve Merritt, also 17, of Beamsville, who topped the secondary school prepared speech category.

Secondary school winners were awarded \$300 in addition to cash and trophies while the elementary school champion was given \$200 in prize money and other trophies.

Runners-up were Donna Hickey, 12, of Almonte, and Christopher Leroux, 12, of Rexdale, in the elementary class; Dan Undersele, 18, of London, and Karen Coe, 15, of Almonte, in the secondary school prepared speech section; Grant Wedge, 16, of St. Catharines, and Andre Durocher, 16, of Timmins, in the secondary school impromptu speech competition. □

Advertising excellence

Ontario Hydro has won a Sheppard Award for advertising excellence in its campaign extolling the benefits of all-electric, year-round climate control systems for commercial and institutional buildings.

Sponsored annually by the Canadian Region of the International Association of Industrial Advertisers, the Sheppard Awards are made in recognition of the most effective Canadian industrial business campaigns.

This year, 10 awards of equal merit were granted. The Ontario award was one of a pair granted for advertising to the professional market, with the entry having included an advertisement featuring heat pump applications in five high schools and another in Commerce Court, Toronto, new headquarters of the Canadian Imperial Bank of Commerce. □

Ye opposed

Municipal Affairs Minister Dalton Bales has opposed recommendations in the 205-page Fyfe report on regional government for Waterloo County and called for a standard two-tier type of administration in the area.

The Fyfe proposal was for a single-tier system for urban areas and a two-tier system for rural areas.

Bales suggested to a Kitchener audience that a two-tiered

regional government is the kind of institutional arrangement that will "encourage the very best kind of planning for assessment. Urban and rural representatives must recognize their mutual interests and work together on one council toward a solution to the problems of growth which affect everybody."

He proposed seven area municipalities comprising the city of Kitchener, the city of Waterloo, the township of Wilmot, the township of Wellesley, the township of Woolwich-Waterloo, the township of North Dumfries and a municipality made up of the city of Galt and towns of Preston and Hespeler and small parts of Waterloo and Beverly townships.

No mention was made in his report of the future of electrical utilities in the proposed regional set-up. □

Management games

Like the pop number "Games People Play," the management games slated for the 1971 AMEU summer conference are bound to make a hit with senior utility personnel across the province.

With a "Your Utility as a Business" theme, the three-day get-together at Thunder Bay's Lakehead University from June 9 to 12 will emphasize workshop participation by more than 400 delegates. Full advantage will be taken of the university's resources. Specific problems such as budgets, marketing, finance and purchasing will be thrashed out in simulated exercises, or "management games," with faculty members leading discussion groups. Social functions are planned and a women's program will be arranged.

Water, water

Ontario Hydro pays rent for running water and the tab is more than the proverbial drop in a bucket. Last year, Hydro paid close to \$10 million to rent the water that drives 61 of its 69 hydraulic stations. And in the last decade, the cash outlay is something in the order of \$75 million.

But it's good value for money. Last year, these 61 stations had a combined capacity of 5.9 million kilowatts, or just less than half the Commission's entire generating capacity.

Water rentals are based on the average annual horsepower generated by the plant. Rental fees are also tied in with the consumer price index.

In most cases, payments are made to the provincial treasurer, with rentals being a payment for lease of the land over which the water flows. In effect, Hydro is paying tax on the land and the Crown is the landlord in most instances.

At the eight stations where no water rentals are paid, Hydro owns the site and its power rights. These are small plants with a combined capacity of only 41,500 kilowatts.

Much of the magnificent parkland in the Niagara Falls area was developed as a result of water rentals. A special agreement provides for a proportion of the Niagara plant rentals to be paid to the Niagara Parks Commission, which owns the land. The rest goes to the province.

Letting off steam

Ontario Hydro's Pickering generating station is letting off steam, but there's no need to worry. It's all part of the normal commissioning process which releases controlled amounts of steam into the atmosphere. The steam carries no pollutants. Pickering's first reactor was started up recently and a second one will begin operation later this year.

Steam from purified Lake Ontario water is passed to the turbines for low-level power tests. During the tests, excess steam is released intermittently into the atmosphere in controlled emissions. Muffler valves have been installed to deaden the sound of the escaping steam. □

Household computers

The day may not be far off when the modern housewife will utilize a computer much like she does her electric stove, dishwasher or other appliances.

In fact, a California housebuilder is already installing computer-operated environmental control systems in new luxury homes. The device will regulate water, light, heat and other utilities for an additional \$15,000 on the price tag of the home.

Apartment and condominium dwellers can buy time-sharing computer systems which sell for about \$120,000, or \$2,000 per family in a 60-unit complex.

Prices are expected to come down, though, and scientists estimate a home installation will cost about \$3,000 in a few years. But even now, computers are being used for various functions including the programming of household shopping. □

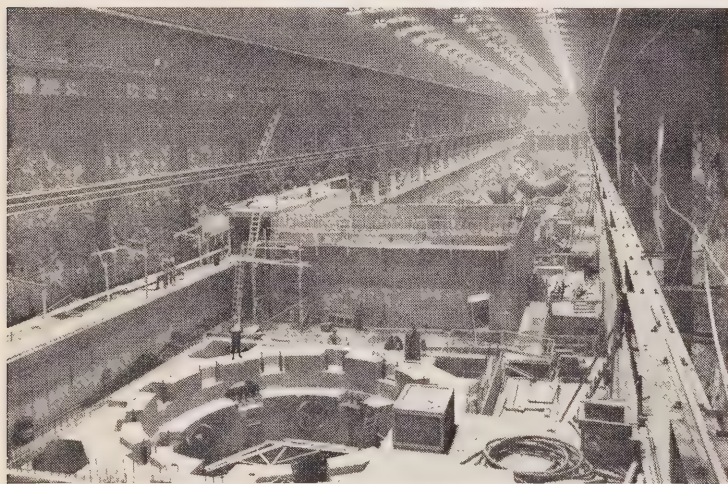
Two down, nine to go

By the end of the year, the first two of 11 units at the huge Churchill Falls hydro-electric power development in central Labrador will be installed.

And their completion will mark a significant milestone in the 5,225,000-kilowatt development. In order to bring them on line by the spring of 1972, major components of the project including dyke, intake structure, spillways, two of three control structures, a transmission line and switchyard will have been completed.

The placing into operation of gates at the Lobstick control structure, 64 miles upstream from the underground powerhouse, early this year will allow the flow of water from the main reservoir to be regulated. The forebay will be filled in the fall to provide water to turn the first turbines.

The work force, which topped 6,000 last summer, will peak around 3,500 this summer. □



Deep down

Bargaining unit

Sixty-four employers in the construction industry, including Ontario Hydro, have banded together to form the Electrical Power Systems Construction Association and will seek accreditation under the Ontario Labor Relations Act.

Recent amendments to the Act identify the electrical power sector as a separate part of the construction industry. The amendments allow employers in designated sectors to form associations to negotiate as a unit with unions working in their particular sector.

The new approach is intended to eliminate a variety of individual agreements between contractors and unions.

Scope of EPSCA is limited to projects of Ontario Hydro's generation projects division and the lines and stations construc-

tion department. The association intends to handle labor relations (including negotiations, contract interpretation, grievances, manpower planning) for Hydro and contractors working on power system construction.

At present, there are about 6,000 employees engaged in the construction. Based on demands for power in the province, the number is expected to double by 1980.

The Ontario Federation of Construction Associations has said the formation of EPSCA is compatible with its own objectives and presents no conflict of interest.

Shown at the founding meeting are Gordon McHenry, Hydro's director of labor relations, who was later named EPSCA president; Dennis Flynn, of C. A. Pitts Construction, and lawyer R. W.



United

municipal briefs

More than 100 family, friends and business associates turned up at a Kitchener PUC-sponsored dinner to honor retiring general manager A. J. Thaler. Mr. Thaler, 51 years with the utility, has been its general manager for the past six years. He will continue to work for the PUC as a consultant.

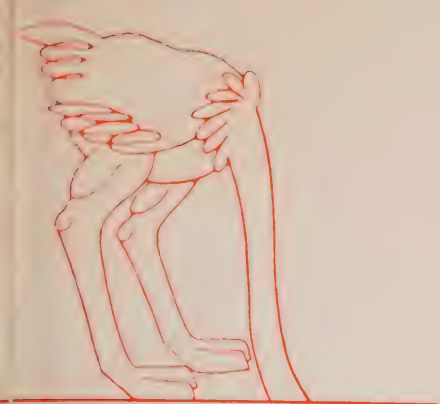
Napanee PUC Chairman Donald K. H. Reid has died at the age of 44. A former councillor and chairman of the town's industrial committee in 1970, Mr. Reid was in business in the town for 24 years.

Former Woodstock PUC Chairman H. R. Henderson died while vacationing in Mexico recently. Mr. Henderson was first elected to the PUC in 1943 and served until 1968. He owned a company in the city which he purchased in the 1930's.

Compec continues to make its sales impact felt in communities throughout the province. At a recent Compec Board meeting it was revealed that utilities from Ajax, Pickering, Bowmanville, Newcastle and Port Perry have surpassed objectives set at the beginning of the fiscal year.

Oshawa PUC has strongly opposed a proposal that favor appointment rather than the election of Hydro commissioners. Chairman Edwin Armstrong cited favoritism and a loss of accountability as his main objection to the scheme, which was advanced in the final report of the Oshawa Area Planning Development Study.

D. R. Code, former consumer service supervisor in Ontario Hydro's Eastern Region, has been appointed rural service superintendent in Hydro's Head Office. Mr. Code at one time was and service superintendent with Nepean Township Hydro.



Don Wright sees it

One of the more comforting things about pollution is the fact that the other fellow is invariably to blame. Looking no farther than the tip of our big fat cigar, we can tell anyone who cares to listen what needs to be done to freshen up the atmosphere. So can the man who drives a car work all by himself in his own private 10-horsepower carbon monoxide factory. Even the newspapers see nothing incongruous in calling for more stringent anti-pollution measures while mountains of old papers strain municipal garbage disposal resources.

Fortunately, this latter problem appears to be on the verge of a solution. Animal scientists at an American agricultural research station say that newspapers can be blended with other ingredients to provide tasty meals for cattle and other farm animals. They claim that a good cow should be able to stow away several 80-page journals a day providing they are properly mixed with molasses, soybean meal, minerals and the like.

It sounds like a mean trick to play on our farm animals, but such a diet couldn't be much worse than some of the instant soups served up to humans from the shelves of our supermarkets. And it would open the door to an important new source of revenue for the publishers. The money may come when no newspaper will print without a cow or a pig or two fattening on the press overruns and munching away at the corporate press releases filed away in the editor's wastebasket.

We might even contribute a few of our back columns to the cause — except we do not believe in casting pearls before swine.

As for the average individual, is a precious metal with a specific gravity of 19.3 and a cash surrender value in the neighborhood of \$35 an ounce. To us, a magazine called *Nature* which is published in England for the edification of those with a scientific interest in the

birds and the bees. It's chock full of rare biological nuggets upon which the light of publicity might otherwise fail to fall.

Typical, perhaps, is a recent column by the magazine's marine vertebrate correspondent which sheds important new light on the sexual behavior of the stickleback. He admits, quite frankly, that he cannot speak for the whole wide family of sticklebacks but he is quite firm in his conclusions relative to the three-spined and 10-spined varieties of the fish.

The females of both species, he has discovered, practice discrimination at mating time. That, as no doubt you have often wondered, is why there are no hybrid sticklebacks. No respectable female 10-spiner will have anything to do with a male three-spiner, and vice-versy.

How can the girls tell for sure they're fooling around with the right mates? It's all in the courtship dance. Three-spined males dance "mostly in a horizontal direction with frequent sorties toward the nest." Ten-spinners simply "display themselves to the female with the head down — making fewer dashes toward the nest."

Small potatoes to you and me, perhaps, but it's all a lady stickleback needs to avoid being stuck with the wrong stickle.

■ The 1971 Stock Traders Almanac, that handy-dandy little guide to the potholes of Wall Street, advances the proposition that girl-watching can be more profitable than tape-watching. According to this well-researched theory, the market, historically, has gone up and down in rhythm with hemlines. Thus, the 1969-70 bear market was to be expected as this period marked the end of the exclusive reign of the miniskirt and the faltering debut of the midi. Present uncertainty can be linked to the chaos in the world of haute couture, which has been thrown into something very close to panic by the unaccustomed obstinacy of the female in resisting the dictates of fashion.

Pant suits have only added to the confusion, but things are looking up. Stocks have been strong of late and the financiers are undoubtedly pinning their hopes for a real bull market on hot pants.

■ Speaking of hot pants, we old-timers tend to equate the term more with temperament than with any particular type of garment and can't get too uptight over a cool chick wearing leather shorts and heavy stockings. Having watched much the same kind of thing for years in connection with Bavarian beer ads and Swiss yodelers on TV, the outfit doesn't exactly turn us on. No doubt it does look better on females.

■ In its all-out efforts to minimize pollution, Hydro is leaving no stone unturned,

but perhaps some of the boys are getting carried away. At least, that's the impression we got in reading about a new device being studied by our researchers called a "back-end scrubbing system." Surely this kind of pollution is the responsibility of the individual?

And Hydro could well have compounded the problem in its search for a way to remove sulphur dioxide from smokestacks. Tests of various limestones being investigated for possible use in the scrubbing process revealed some with very high magnesium content. This reacts with sulphur to form magnesium sulphate, which is better known as the laxative epsom salts. Fancy the disposal problem this might create. A few thousand tons leaking into a city's water supply would make everyone a potential customer for a back-end scrubber.

■ Along vaguely associated lines is a clipping from the *Scientific American* sent to us by one of our own engineers. It's from a "flashback" column and describes amazing cures effected by a French doctor way back in 1870 with the use of electricity.

Involved was an 80-year-old patient, afflicted with a "very obstinate" case of constipation, who had been unable to do any business for 40 consecutive days. Undismayed, the good doctor promptly inserted the negative pole of a Gaiffe battery into the appropriate orifice and the positive lead into the navel. "In the course of two minutes," says the account, "the results were completely satisfactory."

Our engineering friend wants to know what in the world is a Gaiffe battery. We would like to know how much potential it develops and how far the doctor stood back.

■ All of which reminds us of the joke about the little kid who swallowed half a bottle of castor oil. A frantic call to the family doctor brought this advice: "Just keep cool, but for heaven's sake don't point him at anyone."

■ A couple of months ago we credited Canadians with being the gabbiest people on earth. We were out of date. Last year our American neighbors took over the title that we Canadians have held for more than a dozen years. According to "World's Telephones" statistics, U.S. citizens averaged 745 telephone conversations per person in 1970. Canada held on to second place with 710 yakity-yaks in the year. □

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the cover

Brothers Sam and Jack Markle came up with an intriguing sideline to their neon sign business — a gallery of electric art. The gallery claims to be the first in the world devoted exclusively to art forms powered by electricity. "After all, it is the seventies and one-dimensional art just doesn't have sufficient visual excitement," says Sam Markle. See story on page 6.

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Viewpoint

The merry month of may

Garbage has replaced the atomic bomb as the leading news topic and is generally conceded to be the means by which man is most likely to do himself in over the years.

We are speaking, of course, of every kind of garbage, whether it is deposited in the skies by the stacks of industry, dumped into the water at sewage outlets, or cast over the ground in the form of bottles and cans and old bedsprings. And while the situation is serious and must be remedied by the concerted and well thought-out efforts of us all, perhaps we are reaching a state of alarm where the greatest danger is the fear itself.

In any event, a booklet published recently by the Northern States Power Company of Minnesota suggests this possibility.

Entitled "How we failed to wipe everyone out by 1971", the pamphlet was prepared in answer to a letter from a 12-year-old boy who wrote to industry in general with the plea: "Please do something about the bad air or you won't be able to live in the year 2000 AD." This sincere and obviously troubled lad went on to say: "You kill our animals and you kill the human race, too . . . you may not know it but in another century you will kill your own great-grandchildren."

The pamphlet sets out in a very forthright manner the problems together with the many steps NSP is taking in the fight for a better environment. It ends with a letter to the boy from the chairman of the board.

A thought came to us as we put the pamphlet down and looked out of the window over several square miles of the largest city in Ontario.

The sun was shining, the sky was full of fluffy white clouds and many of the rooftops were partially obscured by the lacy lime-green foliage just beginning to unfold. It was spring and the world looked pretty inviting even in downtown Toronto. Yet here was this youngster from Coon Rapids, Minnesota, who could see only disaster out of his window.

Perhaps it was raining the day young Mark Simmonds wrote his letter. We hope so because there must be thousands of young people who share his anxiety and it will be a sad day when they cannot see the sunshine for the clouds.

All of us are indebted to the former Rachel Carson for the early alert she sounded a decade ago in her book *Silent Spring*. The primary concern of this biologist was the widespread and indiscriminate use of chemicals for the control of insect pests and the potential for ecological damage.

At the outset of her book she sketches a desolate picture of an imaginary town where silence has replaced the chorus of robins and doves and wrens and dozens of other birds which formerly marked the dawn of another spring day. She was right, of course, in sounding the alarm.

The only question we would raise at this joyous season of new growth is whether or not there is a danger that we might be losing our perspective in the other direction. It is essential that we be concerned and it is right to be cautious. Irrational fear and the inability to see any goodness in our scientific and technological progress are another matter.

What is to be gained in preserving the quality of the environment if, in the process, we lose the capacity to enjoy it? One thing is for sure. Spring is here again and the robins are back. □

When it comes to shopping centres, North York leads the field

by Sheila Kenyon

An undeniably fascinating spectacle in this era of the superstore is the opening of a new shopping plaza. Thousands of eager customers will descend to participate in all the hoopla, scoop up the specials and murmur critically at the fountains, lighting and other innovations in design. All traffic for miles around seems to be headed that way.

And North York, spreading north of the City of Toronto, claims to have witnessed more shopping plaza openings than any place in Canada. It has also been a proving ground in design.

Not only did it see the opening in the fifties of Northtown, one of Canada's first large-scale open shopping areas, it's also the home of the nation's largest shopping centre — Yorkdale. And last summer the municipality broke new ground with yet another concept, the two-storey Fairview Mall.

All this activity has meant much more to North York Hydro than the adding of a few customers to its already burgeoning resi-

PLAZATOWN



covered walkways at Don Mills Shopping Centre to the huge parking areas and unique architecture of Yorkdale. Original farmhouse still stands next to Northtown Plaza.

dential and commercial electrical load. A large shopping centre may require as much electricity as a town of 10,000 people. Yorkdale alone represents a community the size of Leamington or Renfrew in terms of power consumption.

"We've worked with all sorts of plaza developers," says Alex Christie, in charge of customer service for the utility, "and we've had to become experts in estimating their needs."

Today, North York is the third largest municipality in Canada. It covers an area of close to 70 square miles and is home to more than half a million people. Its growth has been typical of Canada's exploding suburbia as a lazy rural area gave way to housing developments, high-rise apartments, new industry, a university and community college and regional hospitals.

With this growth, North York Hydro, a small rural utility with 702 customers and a gross income of \$20,500 when it started operation in 1924, has been catapulted to an organization with \$31 million gross income and serving 127,400 customers.

"We're now larger than Ottawa Hydro and second only to the City of Toronto in number of customers. From 1950 to 1960 our growth averaged a 25 per cent increase annually," says Don White, manager of the utility and its 362 employees.

Seventy-five per cent of North York Hydro's annual income goes to Ontario Hydro to purchase electrical power, 12 per cent to operation and maintenance, 4 per cent to interest and principal on debt and 9 per cent for plant extensions and improvements.

Northtown Plaza, built in the booming fifties, was the first large shopping development to appear on the North York horizon. Heralded as "Canada's greatest shopping plaza in the world's fastest growing city," this U-shaped, outdoor plaza with its original 52 merchants was the site of square-dance marathons and other entertainment. With parking for 1,200 cars, it drew customers from Toronto and beyond.

Its promoters chose as their big-image mascot the mythical Paul Bunyan and claimed he was a Canadian, which led to a soft-pedal international dispute involving the indignant residents of Minnesota — they reclaimed him as an American legendary figure.

Little did the developers realize they could have laid claim to a legitimate Canadian legend. According to Oscar Smith, who owned the land on which Northtown stands and who still lives in the original farm house, William Lyon Mackenzie operated a printing press there.

"When we papered the room that is now my bedroom, we could see printers' ink on the wall," says 83-year-old Mr. Smith, who has lived in the old house since he was a boy. He claims that Mackenzie's press was thrown down one of the farm wells. "We had three wells on the property and, as Northtown is built over two of them, the press could be there still," he adds.

Mrs. Smith likes having a shopping centre in her backyard. "I'm always trotting over to the Dominion store. See where the cars park — that used to be the fruit orchard. This old house has such thick walls we're never disturbed by the noise from the shoppers."

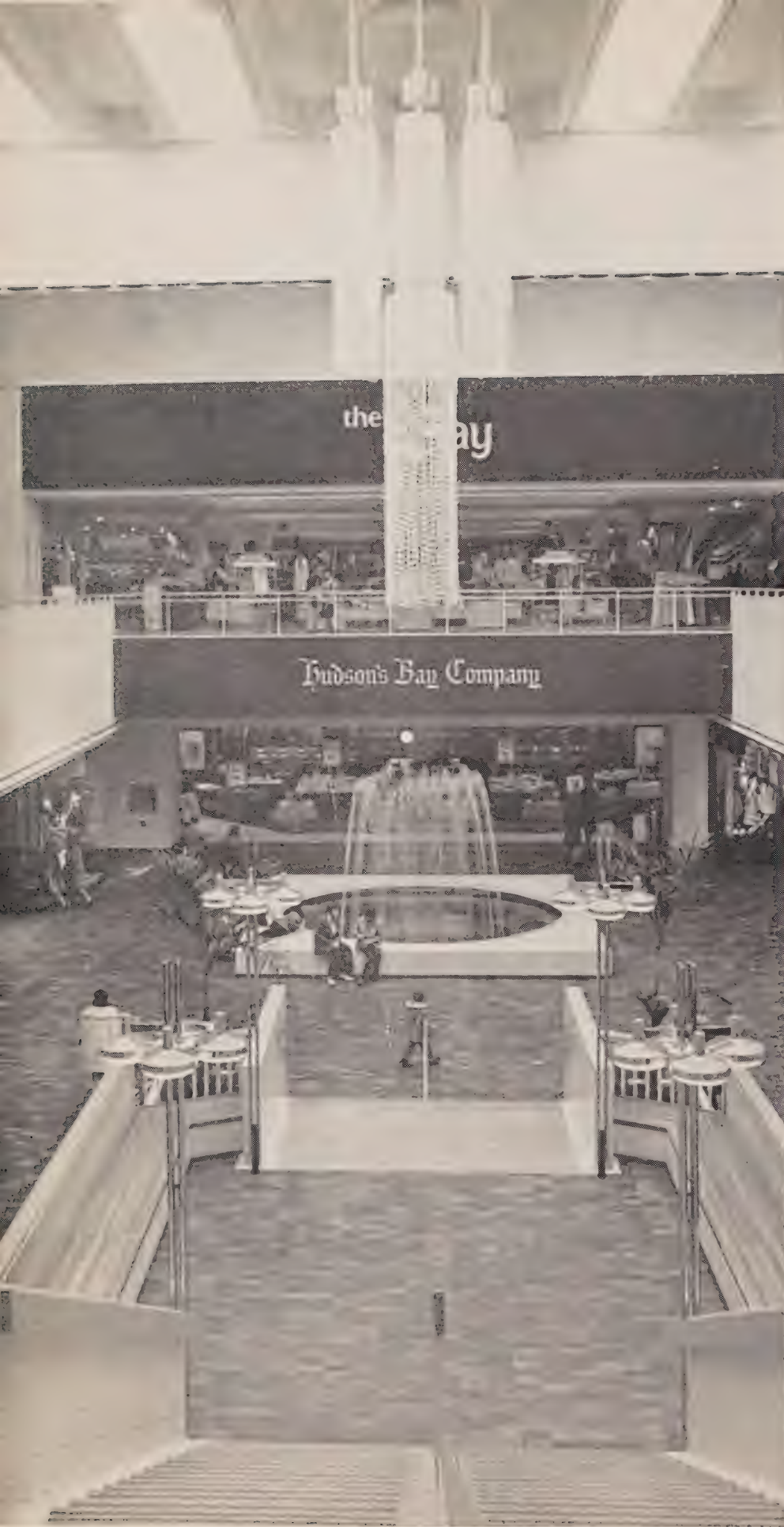
One labor-saving idea that North York Hydro acquired from its Northtown experience was the centralization of store customers' meters. Each of the stores at Northtown has its own meter. "Sometimes, they get buried behind stock and new meter readers haven't any idea where to look for them," says Alex Christie.

At Fairview Mall, which is not electrically-heated but has a heavy electrical load for lighting and air-conditioning, all customers' meters are housed in a central meter room. The planning for Fairview took 15 years and the centre cost about \$30 million.

North York customer service staff and engineers worked with the developers to ascertain how best to provide transformer space. "It's obvious," says Mr. Christie, "that our equipment cannot take up valuable space which might be rented to tenants. For instance, at Fairview several of our transformers are located on the roof."

North York Hydro equipped five separate transformer vaults to provide Fairview with electrical power. Walkways on the roof of the mall were reinforced to allow transformers to be moved across them, then raised or lowered to the ground by means of a crane. Each transformer handles sufficient power for 1,500 homes.

Fairview Mall is owned in partnership by the Hudson Bay Company, the Robert Simpson Company and Cemp Investments. One of the problems facing the designers of the two-storey centre was to find a convenient way to get customers from the ground floor to the upper level. Originally



they planned to install an escalator, but eventually they chose a moving sidewalk — the first in Metropolitan Toronto.

Known in trade jargon as a movator, the sidewalk takes people with shopping cart or even baby carriages from the lower to the upper level. It's similar to Canada's first moving sidewalk, installed at Dorval Airport in Montreal.

Yorkdale Shopping Centre, which opened in 1964, is owned by Triton Centres. North York Hydro established the basic design for the electrical system to serve Yorkdale in 1958. The first shovel broke ground in 1962. Today, Yorkdale has 112 stores, visited by over half a million customers weekly. In spite of parking for 6,750 cars, it isn't always possible to find a place — last Christmas, they had to close some of the ramps leading to the parking lot.

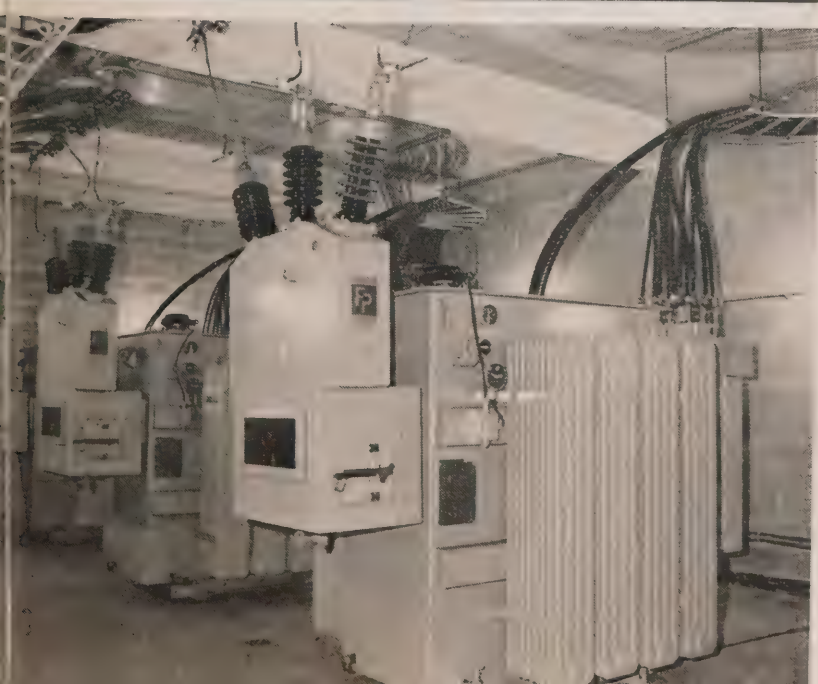
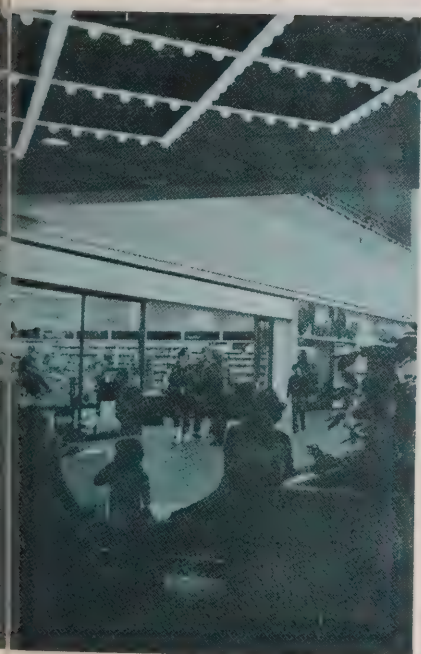
Yorkdale's transformers and ancillary equipment cost North York Hydro \$500,000 and are housed in seven vaults under the building. "We have servicemen check the installations regularly and carry out maintenance work and clean the vaults," says Mr. White.

Yet another plaza located in North York is the Don Mills Shopping Centre. It, too, was an innovation in design when it opened in the fifties. Don Mills borrowed the concept of the European open-air shopping centre with shops facing an inner walkway, and with benches, fountains and attractive landscaping. For the Don Mills housewife, isolated from downtown shopping, it's an ideal place to spend a spring day window shopping or treating the children to a lunch in the open air.

Although it's not in North York, no account of shopping centres would be complete without mentioning Metro Toronto's newest shopping centre, Sherway Gardens. Located in Etobicoke, its two major department stores are separated by one-third of a mile of 125 enclosed shops and restaurants. Ted de Swart, promotion manager for the Gardens, speculates, probably correctly, that they'll draw some customers from Yorkdale.

But in terms of sheer size Yorkdale, and North York, still draw first place in the shopping plaza stakes. □

With its air-conditioning, moving sidewalk and attractive lighting, Fairview Mall has a heavy electrical load. Consultations between North York Hydro and the developers ended in the transformers being located in roof-top vaults to save space. Utility manager Don White is pictured at right.





WHO NEEDS A WHISTLER'S MOTHER?

by Jean Hope

to one. Not when you can zap and glow in your own electric chair.

The last thing in the world most people want is an electric chair. Yet one is available that zaps and glows in a blaze of neon doing that will mortify traditionalists and delight the unconventional.

Weighing in at 850 pounds and priced at \$850 the chair, which really looks much more like a throne, is available at the Electric Gallery, Toronto. With 37 incandescent bulbs and three fluorescent lamps, it could be just the conversation piece to liven up your next party. It's also guaranteed not to electrocute your guests, although it may stimulate a mild heart attack or two.

The Electric Gallery, run by brothers Sam and Jack Markle, claims to be the first art gallery in the world devoted exclusively to a multitude of art forms powered by electricity.

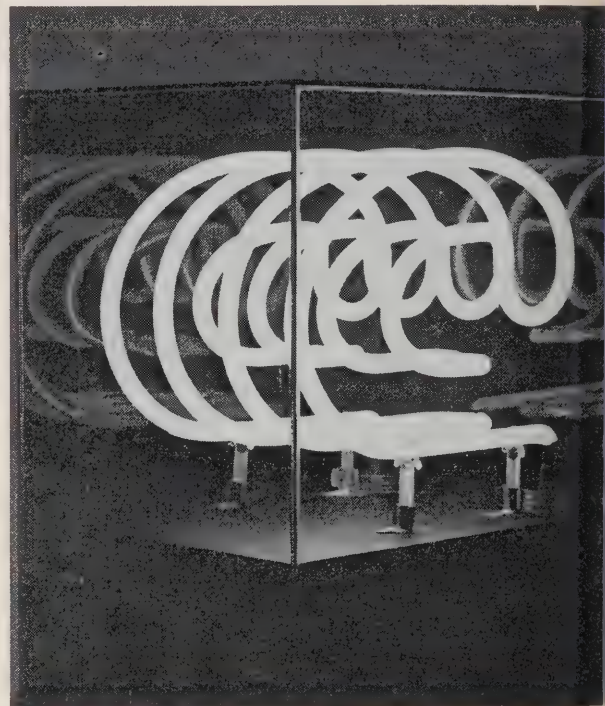
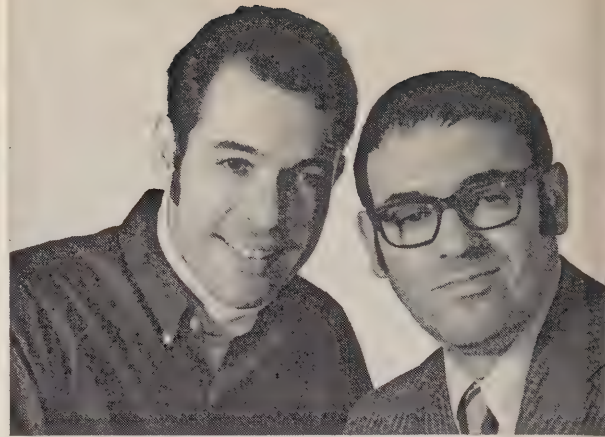
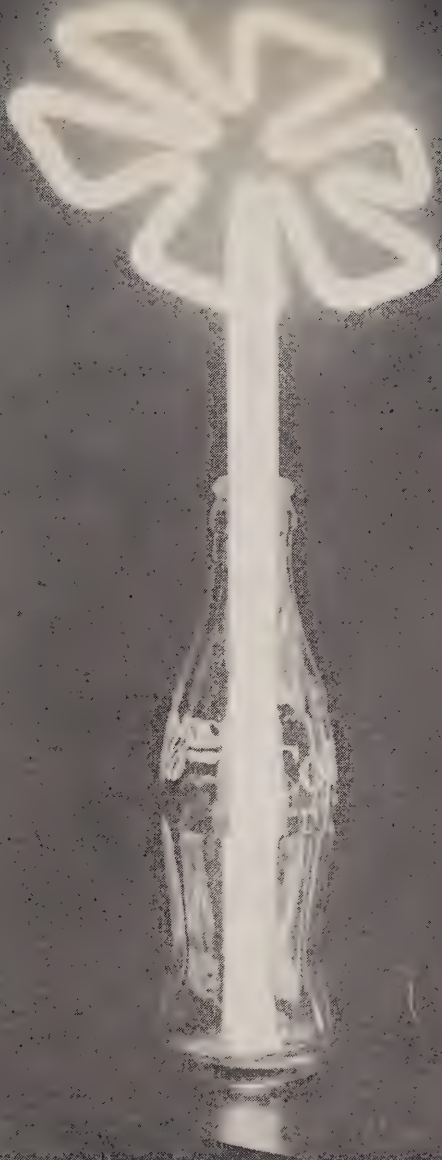
If your preference is for a quiet landscape to grace the living-room walls, then don't

go to The Electric Gallery. For everything here glows and glitters and bleeps and moves and is anything but background material.

But, as Sam Markle says, "after all it is the seventies and one-dimensional art just doesn't have sufficient visual excitement."

There's no denying that electric art is exciting. Imagine the gallery itself. The front entrance has been sealed off, so that you follow a strip of white neon on a black wall down a narrow laneway and enter through a side door. The neon tube enters, too, through a strategically-cut hole. Inside the darkened interior, the black-white motif is repeated with white-white walls and black broadloom, but the visitor is only aware of a visual explosion of color and movement from every corner.

Electric art itself takes many forms and it isn't all that new. Some types of it were being designed in the twenties. But it's



only since the mid-sixties that it has come on strong.

"It's a natural extension of pop and camp art," says Sam. It is certainly fun. Picture a Coke bottle complete with neon flower for that dull corner you can do nothing with. It's yours for \$175.

Or if you've played all the games people play, how about an electric tic-tac-toe? During the Christmas exhibit, 10 such electric games were assembled, either to be played conventionally or just looked at.

Another type of electric art takes the form of subtle sculpture featuring cubes of white acrylic illuminated within by flashing lights creating rainbow geometric patterns and colors. Although these cubes, designed by Bill Hawkes, could be prosaically used as tables, the artist has erotically entitled them, "Art To Make Love By."

Earl Reiback, a one-time nuclear engineer, has one of the most technically-involved

pieces at the gallery. His "Lumia" is a constantly changing light image, slowly evolving in shape and color within a black box. These images are shaped by a combination of lenses and prisms in a programmed sequence that will not repeat itself for 10 to 30 hours, and in the most beautiful colors and shapes imaginable.

Or if gears are your thing, you might like the work of Roger Vilder, who arranges motor-driven gears to create mesmerizing optical patterns.

The first woman to exhibit, Irene Krugman of New Jersey, does something entirely different. She uses vinyl and plastic sheets to cover pillow-padded platforms and then drives them into writhing and groaning live sculpture through the use of gears and motors.

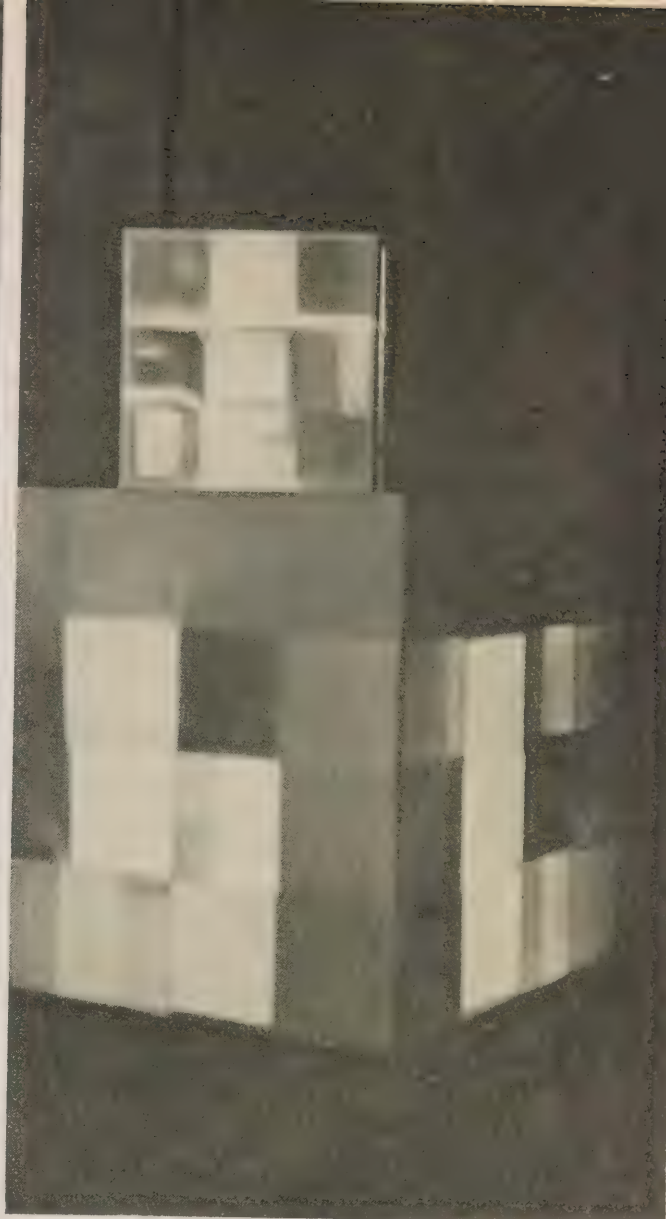
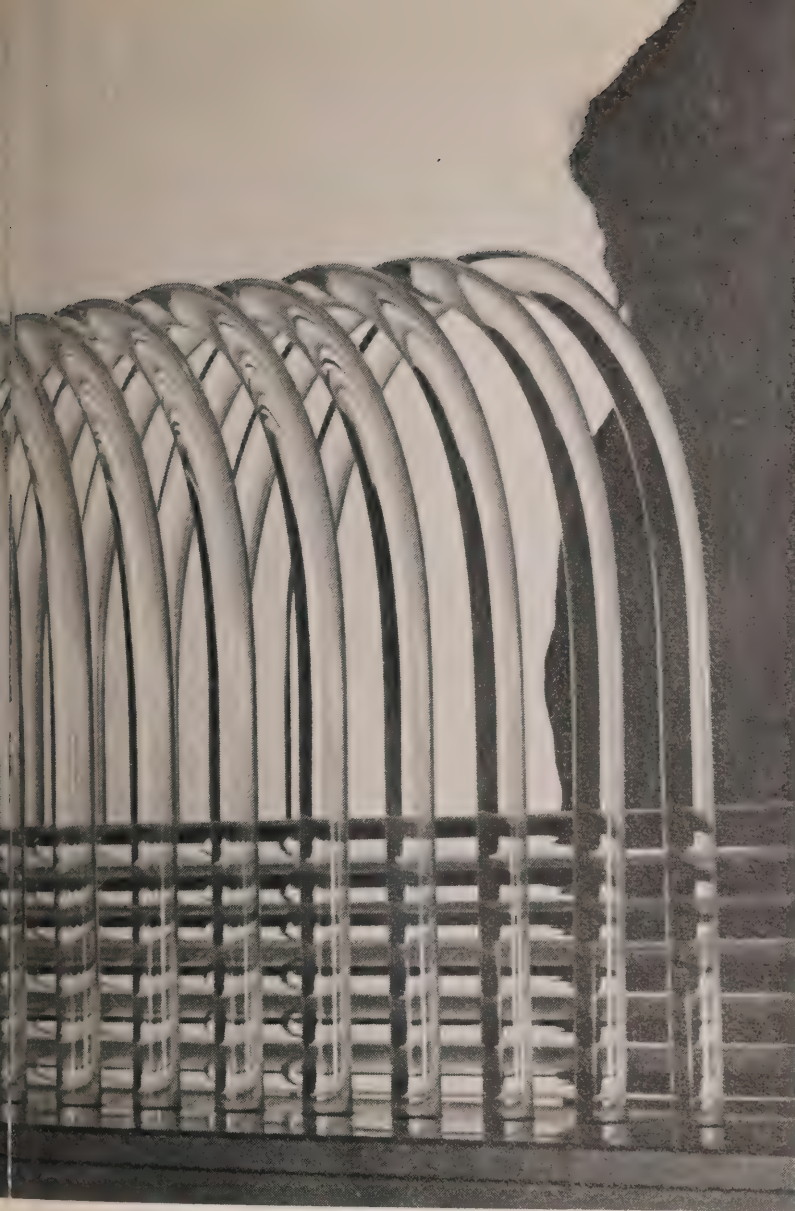
How did it all start? Well, the brothers Markle are both in the neon sign business

and started playing around with neon sculpture in their spare time.

Their factory, Sam relates, is "a sort of playground for artists." Those who want to are encouraged to work there, to use the machinery and even scraps of tubing. If they need help with the construction this is provided. The finished products, the artists like the idea and the Markles like the works, are exhibited at the gallery.

The Electric Gallery changes its show about every three weeks. The Markles themselves usually have some of their work on view. For example, the Coke bottle with neon flower is Sam's design and a best-seller. And Jack, who won prize in the 1967 Carling Fall Festival for his electric "Totem Pole," a six-foot tower of tubing in an acrylic cube, shows various types of kinetic art.

Recent exhibits have been by Canadian Michael Hayden, Bill Hawkes, Martin



hshberg, Ziggy Blazeje and Roger
ler, while Americans Charles Waldeck,
Michael Sector and Earl Reiback are fre-
quently seen. In fact, the Americans get a
dear showcase for their electric art in
Canada because New York galleries only
show their work periodically in conven-
tional galleries

While many of the artists have worked in
the standard art mediums before entering
the field of electric art, some have come
directly from an engineering or other
technical background. If the artists don't
have the know-how to make their creations
themselves, they can employ the services of
specialists to get the desired effects

Of course, none of this art could exist
without electricity. Says Sam Markle: "The
important thing an electric gallery
needs after artists, is electric power. The

Electric Gallery has been completely re-
wired with 34 separate circuits. The first
thing gallery visitors encounter inside is a
large electric control panel from which, if
they wish, they can control individual
pieces of art."

What to do if you bring one of these ani-
mated beauties home? Just plug into a
regular 110-volt outlet. If the art happens
to be neon, which demands a relatively
high voltage, a transformer is built into the
base

Prices range from about \$100 for the mass-
produced to \$8,000 for a one-of-a-kind
and compare favorably with conventional
works of art of high quality. Most of the
customers to date have been young,
swinging couples, architects and engineers
who like the uncluttered environment this
form of art demands

After all this, will anyone be surprised with
Whistler's Mother?

*Exhibits in electric art gallery run by Sam and Jack
Markle include Sam Markle's neon flower in a
Coke bottle, other pieces of neon-type sculpture
and a work composed of lighted opaque cubes*



THE WINGMAKERS

perb examples of engineering precision and skill, today's high-flying jetliners demand, in their construction stage, management techniques undreamed of a few years ago and resources available only to large multi-national corporation.

The giant DC-10, which is 180 feet long, and will carry up to 345 passengers, is no exception. Its nose is built by McDonnell Douglas in Santa Monica, other components in St. Louis and still others by sub-contractors in Ohio, Quebec, England and Italy. They're all shipped to Long Beach, California, for assembly.

For the sleek 155-foot wings that will carry the aircraft aloft, they're manufactured by Douglas Aircraft Company of Canada Ltd. (Dacan) in Malton, Ontario. Dacan, alone, utilizes the services of approximately 500 Canadian sub-contractors and suppliers.

The plant, which employs 5,700, also manufactures fuselage sections for the DC-8 and complete wing sets, floors and rear fuselage sections for the short to medium-range DC-9.

"We've delivered 20 sets of wings for the tri-engined DC-10 and four of these aircraft are already flying in the test program, which is going extremely well," says Dacan spokesman Peter Macdonald.


An operation like Dacan's obviously demands a great deal of electricity. The peak load is around 7,600 kilowatts, which is roughly equivalent to the consumption of a town the size of Parry Sound. Power is delivered to the plant's four substations from Mississauga Hydro.

Riveting is performed by pre-programmed automated machines that drill, countersink then insert and punch the rivet, shave the head flush with the wing skin and position the wing for a repetition of the sequence. About 46,000 rivets are installed in this manner in the panels of each pair of DC-10 wings.

In the aircraft industry there can be no half-measures. Quality control techniques include close examination of materials and components with everything from ultrasonic devices to ultraviolet light. The entire wing-building operation, in fact, is as efficient and streamlined as the eventual product.

Wings of the giant DC-10 are seen under construction at Douglas Aircraft's Malton plant. Four of the jetliners are already being test-flown.





city of trees

by Joan Pierson

London, the focal point of a multi-million-dollar trading area, has been described as a "microcosm of Canadian life." Yet this most typical of Ontario cities has one feature that sets it apart from the rest . . . its trees

It would take an experienced arborist to recognize all the species of trees that are planted on London's streets. The most familiar are the colorful sugar maples, but others, such as American ash, honey locust, American elm, catalpa, soft maple and little-leaf lindens, give grace and beauty to the city's boulevards

Citizens of this self-styled "forest city" take great pride in their trees, which cost them many thousands of dollars in extra taxes. In fact, the PUC employs a staff of 14 to look after them year-round

Whenever it's necessary to remove old or diseased trees, the PUC switchboard gets calls from anxious citizens. But felled trees are always replaced, nowadays by attractive shade trees that do not grow tall enough for their branches to interfere with power lines and with root systems that will not block the city sewers. They include such species as the flowering crab, little-leaf linden, the plum-leaved flowering hawthorn and the ginkgo

The ginkgo tree has a strange history. One of the oldest trees known to man, fossilized specimens of its leaves have been found dating back at least 100 million years. Yet the ginkgo has never been discovered in original stands or in forests, but only where it has been planted by man

Dr. Sherwood Fox, one of the founders of the University of Western Ontario, imported and planted the first ginkgo in London. It still stands today on the Western Campus, which in itself is an arboretum. The grounds are open throughout the year to visitors who can still see the Carolina silverbell, the Russian olive, the Kentucky pear tree and many other rare species in bloom

London may be a growing city, but a by-law makes it mandatory for the developer

A recent survey by London PUC showed 40,000 trees comprising nearly 60 different species on the streets alone. And myriads more grow in the parks and bloom in private gardens.

of each subdivision to leave room for trees along the boulevards. The city's "tree budget" permits the planting of 1,000 trees a year. By far the greatest portion of the money goes in labor costs.

In one new subdivision, though, residents were so eager for tree-lined streets that they circulated a petition asking each family to provide free labor for the PUC.

Earth flew from spades and shovels as 700 holes were dug by enthusiastic volunteers. The crowd cheered as a PUC truck bearing the saplings arrived. Each family chose its own tree. The 700 Norway maples and little-leaf linden they planted complement the modern low-profile suburban homes and give untold pleasure to the community.

At times, Londoners have paid a heavy penalty for their trees. One such occasion was a violent ice-storm in January, 1968, when heavy, ice-laden branches splintered away from their trunks bringing down power lines and disrupting service. Wary from lack of sleep and stiff from the intense cold, Hydro crews worked around the clock to restore power.

Yet the storm proved many things. When the power went off, many people "turned on" and responded to each other's needs with sympathy and understanding. One man heated a can of soup for an elderly neighbor with a blow torch. Many people held impromptu candlelight parties. One enterprising host discovered that without Hydro there were no ice cubes in his fridge. After a moment's thought, he went outside and snapped off some ice-laden twigs. They made ideal swizzle sticks!

London's reputation as the "forest city" began 100 years ago. The original settlers had cleared the land and the streets were bare. An alderman, James Egan, spear-headed the first tree-planting drive. More than 15,000 were planted in the early 1870's. In 1878, the Ontario government paid people 25 cents for every tree they planted. London made a similar offer in 1884, and the population responded

generously by planting thousands of soft maple trees.

The soft maple was the cheapest tree available and they planted them 15 feet apart instead of the usual 40 feet. Citizens caught damaging a tree by using it as a hitching post were prosecuted.

Nowadays, tree-planting is the "in" thing in London and many offices and factories have surrounded themselves with trees. The head office building of the London Life Insurance Company, accommodating more than 2,000 people in the downtown area, has a striking display of trees and flowerbeds.

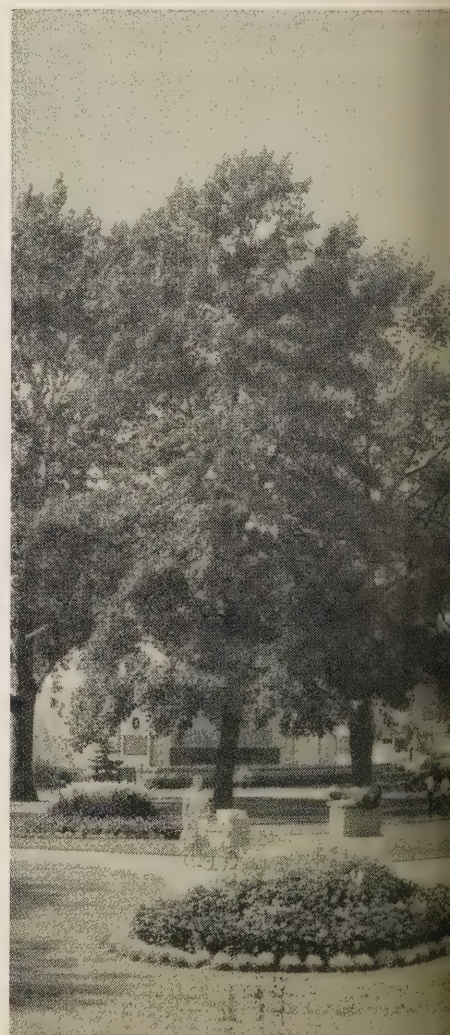
Across the road from London Life is Victoria Park, which contains 15 acres of carefully-tended flowerbeds and stately trees. White spotlights placed in majestic elms and maples are switched on each evening, revealing the delicate tracery of the branches against the night sky.

Dr. Chauncey D. Leake, of the University of California, says that trees, in addition to beautifying the landscape, are beneficial to health. "The leaves help maintain a balance of carbon dioxide and oxygen in the air we breathe," he adds.

Londoners are rightly proud of their trees and frequently phone the PUC, which offers free advice on their care. And in the middle of a hot summer, what other city would carry this headline in the daily newspaper?

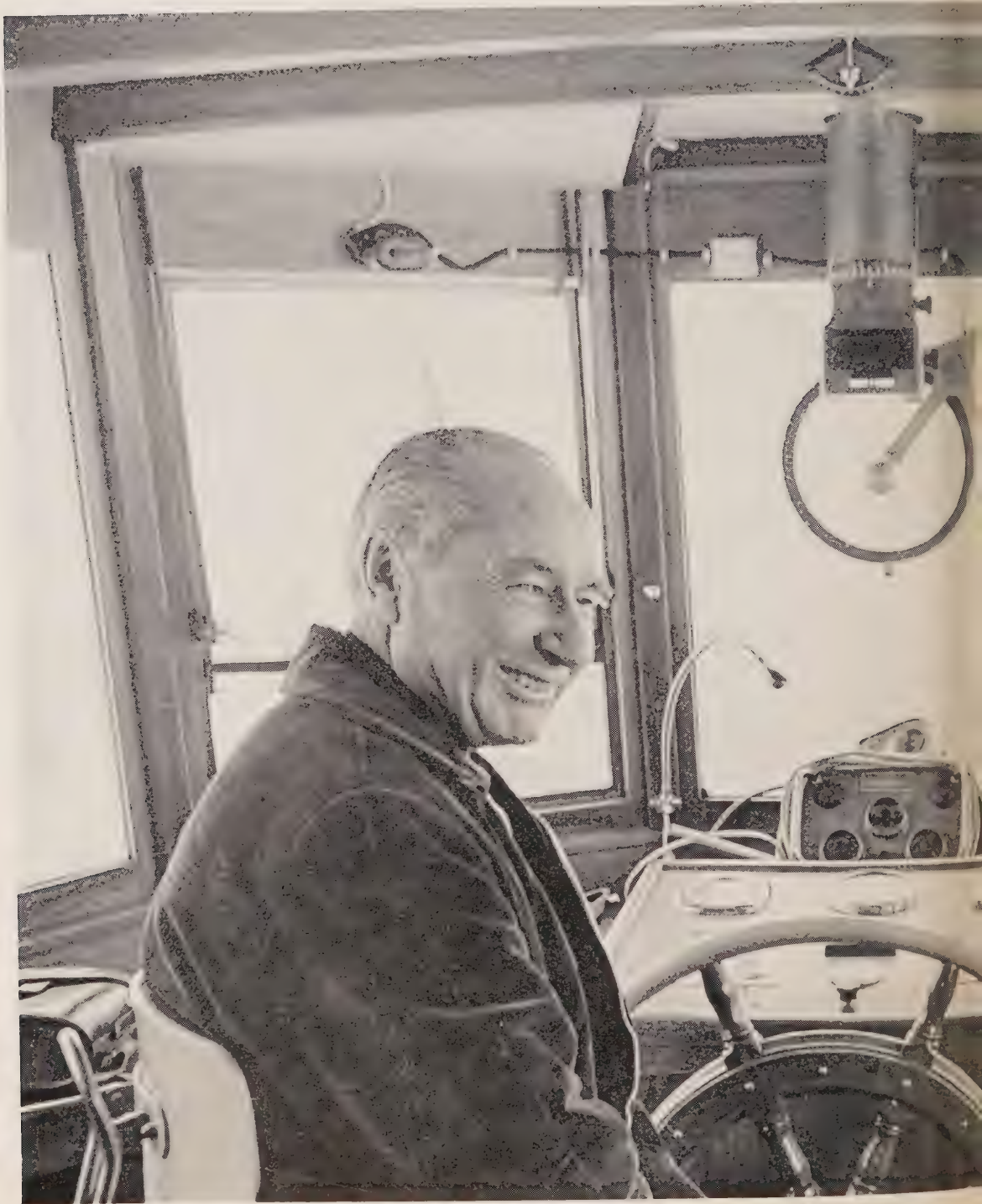
"Please give your trees a drink." □

Modern lines of the London Life building are enhanced by trees while, across the road, Victoria Park has 15 acres of flowerbeds and stately trees. Photos on extreme right show a typical residential street and part of Greenway Park.





Inboard runabouts or ocean-going yachts, Cliff Richardson tailor



to individual taste

boatman of the Big Head

by Rae Hopkins

The Second World War was still in its infancy when Cliff Richardson set up shop where the Big Head River empties into Meaford harbor.

He'd been in the boatbuilding business from the early thirties, but only during the winter months. Spring, summer and fall were taken up helping his father operate a marina at Pointe au Baril in the Thirty Thousand Islands.

In the early years, young Cliff Richardson took all his orders in the summer. "Then in the winter, another fellow and myself would set out to build the boats in a small shop we had behind the local funeral parlor.

"The first one we turned out was an 18-foot inboard runabout — I designed it myself for a fella name of Joslin in Cincinnati — and in that same winter we built two or three outboard racers. They were 14 feet, as I recall it."

So it was throughout the thirties . . . run the marina in the summer and build boats in the winter. The last pleasure craft to leave the Cliff Richardson Boat Works was a 30-foot twin-screw cruiser — that was in 1941 — just before work started on boats for the Department of Defence Production.

Richardson whalers and diesel cutters were much in demand during the war. Orders poured in from both the navy and air force, swelling the two-man operation "behind the undertaker's" into one of Meaford's larger industries. In fact, the boatworks outgrew its original quarters as a result of the demand.

As peace returned to the world, a calm settled over the boatbuilder's shop at Meaford harbor and orders slowly began to come in again for pleasure craft.

But like almost everything else at that time, boat-building materials were in short supply. However, the boatworks did manage to fill a few orders and install a marine railway to accommodate the larger craft that were to be built and serviced there.

Now all of the original wooden buildings at Richardson Boat Works have disappeared, and so has the original name. It's now Cliff Richardson Boats Limited, a custom shop that was incorporated as a limited company in 1959 with the elder Richardson as its president and his son, Alan, its secretary-treasurer.

The company president likes to assume a comfortable perch at the wheel of a Dutch-built trawler that's tied up at his wharf for refitting. The craft's electrically heated and has doubled as a ski lodge all winter.

Electric heating in this and two other boats at Meaford is a Cliff Richardson innovation. "Electric heat was the simplest way of keeping the boats warm so work could continue in the winter. All we did was run a 240-volt service to the poles along the dock. And from there we merely connected an extension cord to baseboard heaters installed in the boats.

"We disconnect the service in the spring when it's no longer needed — but the load helps our utility in the meantime," Mr. Richardson adds.

And there's little question of his interest in helping Meaford PUC. He's been a member of the commission for 16 years — about half of them, including this year, as chairman.

Another idea is the use of a compressed air system to keep ice away from the boats. The ice gets pretty thick where the Big Head runs into Meaford Harbor, but it's kept at least three feet away from the hulls of Richardson's boats.

Perforated tubes beneath the vessels carry air at 30 pounds a square inch to the harbor floor. The air circulates warmer water from the bottom to prevent surface freezing. Ontario Hydro employs a similar system at generating station intakes to prevent ice from clogging them.

"On exceptionally cold days, we may get a little thin ice around the boats — but it's

With electric heating aboard, the Shawanaga II doubled as a ski lodge during the winter months. A compressed air system, bubbling warm water from the harbor bottom, keeps ice well away from boats tied up at the Richardson wharf. In the warmer weather, many sea-going yachts begin their long voyage from Meaford Harbor, like the Richardson-built craft on the right.

too thin to do any harm," Mr. Richardson says.

Fourteen-foot steel punts, 54-foot ocean sailing yachts, or 22-foot inboard runabouts bearing the Richardson insignia all have one thing in common – they were constructed by a team of 15 highly-skilled craftsmen whose average length of service with the firm is something in excess of two decades.

There's Dave Reid, for example, who does "a little electrical work and is really a general all-round man" in the 14,000-square-foot shop. In his spare time he fashions first-class split bamboo fly rods for the trout fishermen in this, one of the best rainbow territories in North America.

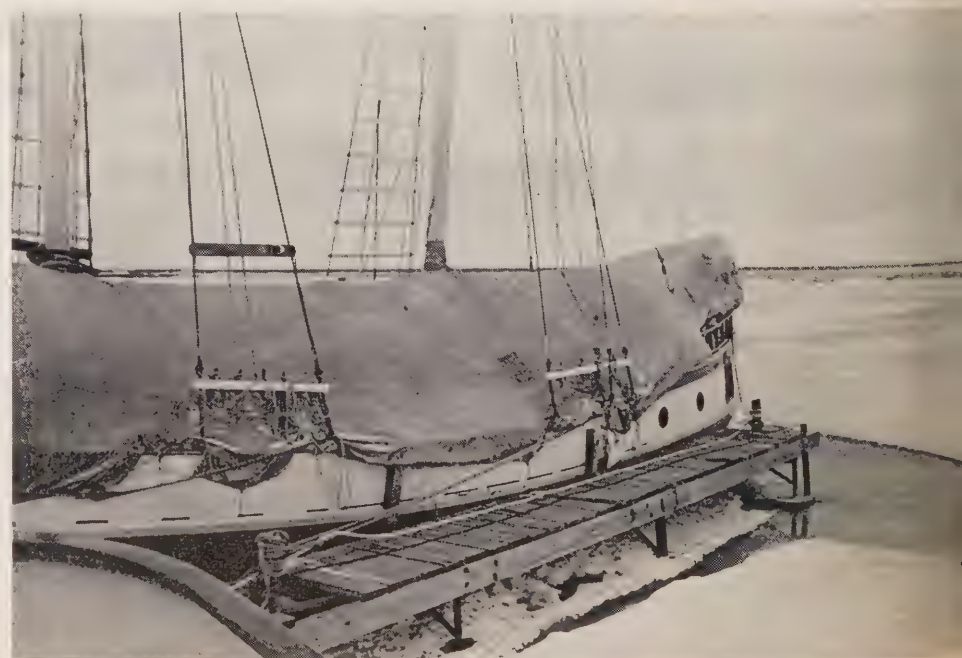
There are others, too, who are journeyman cabinet makers – all the big pleasure craft that float into Georgian Bay from the Richardson works are lavishly furnished – and carpenters, and welders, and sheet metal workers. But they're all basically boatbuilders.

Richardson Boats is a custom shop because that's the way its president has wanted it. "Never could get interested in the production line type of operation," says the greying master seaman.

"Sure, we do have patterns of our own, but we really prefer our customers to deal with a naval architect. That way he gets exactly what he wants in either a boat we build or refit.

"Matter of fact, the bulk of our business is renovation," he adds. "Like the Vulcan there. She'll be worth about half a million dollars by the time we're finished with her. When she arrived here from Florida she was really nothing more than a 70-foot hull and cabins. We're finishing her inside completely and when the job's done she'll carry something like \$15,000 worth of electronic equipment."

Mr. Richardson points out that most pleasure craft carry between \$10,000 and \$15,000 in navigational aids, ranging from





One of the giant diesel engines for the 70-foot Spindrift is lowered into position while a sea-going ketch takes shape in the Richardson workshop.

radar to depth finders, direction finders and ship-to-shore radio equipment.

It was around 1955 that Cliff Richardson foresaw a future in building steel boats for commercial use and in that year his company produced a 40-foot workboat. Since then there's been a steady increase in the number of steel craft turned out at Richardson's, not only in the commercial field but in pleasure boats, too — like the ocean-going steel sailing yachts that begin their long voyages from Meaford.

In 1965, the firm embarked upon aluminum boat construction and giant ketches still roll out of the shop here, some of them bound for far-off places like the Caribbean.

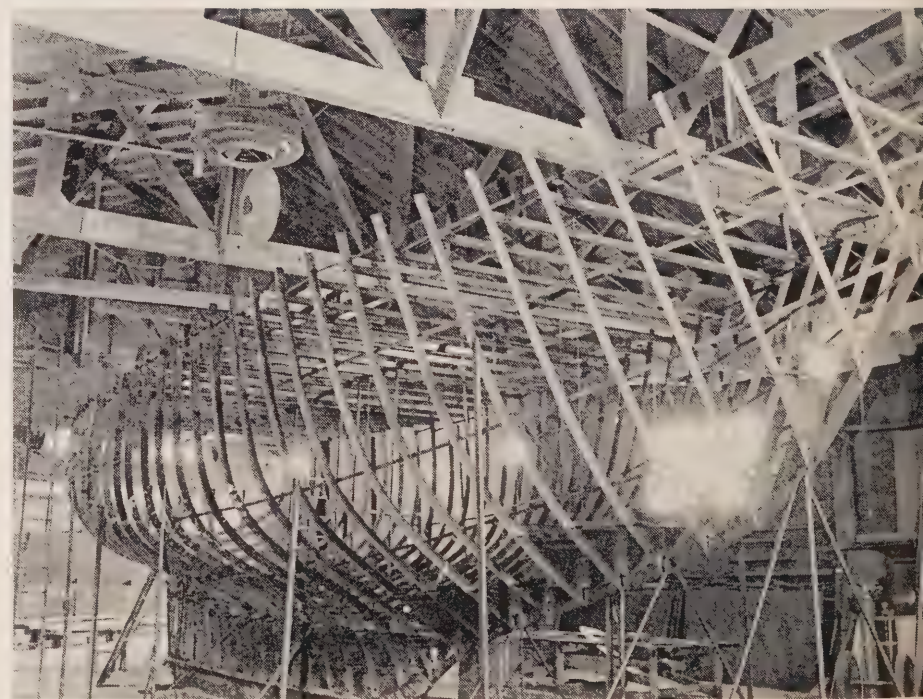
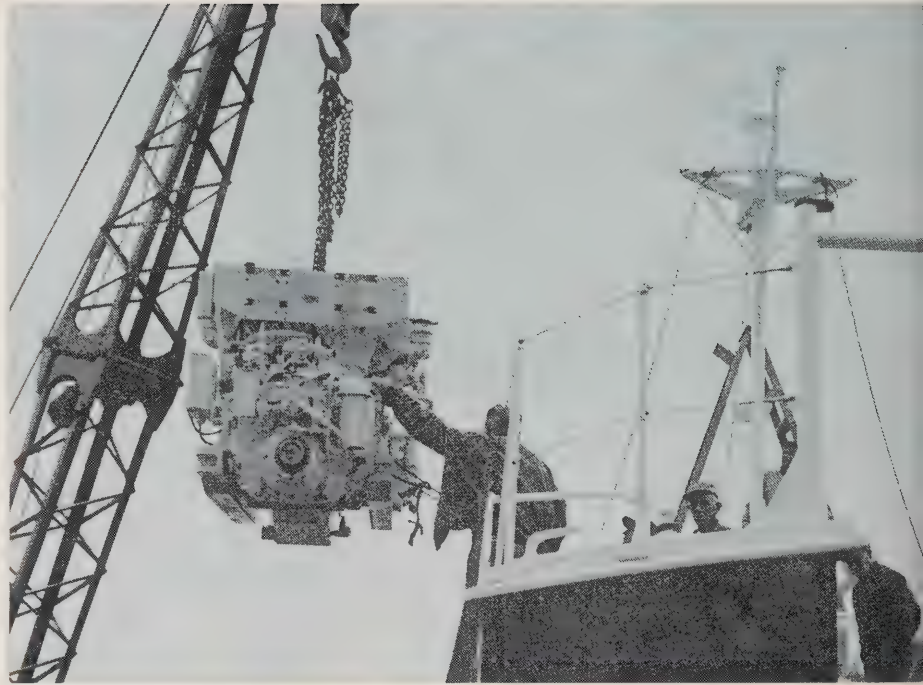
But despite the advances into steel, aluminum and fibreglass, the traditional wooden craft is still a favorite around the Richardson establishment — "there's still nothing to compare with a mahogany boat," says its president.

One of the best known of the Richardson fleet today is the 70-foot Spindrift, a cutter custom-built for the Canadian Coast Guard in 1964. She has a cruising speed of 15 knots and every year is pressed into service on the Great Lakes in rescue operations.

While the cabin cruisers that come from Richardson's are beauties, Cliff Richardson still insists that sailboats are the best for sea voyages. "Cruisers ride on top of the water, but not a sailboat. They ride down in the water, and although they may not answer to the steering quite as fast as a cruiser, they're still by far the most fun," he says.

Cliff Richardson "has pretty well retired now," or so he says. But even in retirement he's still around the boatworks "just to oversee the operations and help out with the electronics and what have you," seven days a week.

He doesn't own a boat now, nor will he. For he insists that if he ever gets away from "this place," the last thing he wants is a boat trip. □





long hydro lines

it for policy

Ontario Hydro commissions will be continued as currently constituted in a proposed regional government setup in the Sudbury Municipal Affairs Minister Dalton Bales recently told a busy audience.

Ontario Municipal Board chairman J. A. Kennedy has recommended a regional administration for the area which would include one city, Sudbury, composed of Copper Cliff, Broderick and the present city of Sudbury, and five townships — Balfour, Collingwood, Neelon and Garson, Valley East and Waters.

The study proposes, Mr. Bales said, that the powers and duties of public utilities commissions, except with respect to the sale and distribution of electrical energy, become duties of the area municipalities or regional corporation.

The supply of electricity by local commissions would not form the subject of regional legislation, he pointed out.

He added that a general government policy on the relation of the commissions and regional government would precede any re-organization of these bodies. □

cottages, now

Ontario Hydro's electrical modernization plan has been extended to cover updating the electrical circuitry of cottages now being used as year-round vacation or retirement homes.

The decision to extend the plan resulted from a successful year test market in Georgian Bay Region.

The plan provides loans to customers of from \$100 to \$2,000 with a 10 per cent down-payment and an interest rate of 10½ per cent. Customers are given up to a 10-year repayment period, depending upon the amount financed.

The financing covers such modernization as service entrance, panel board equipment, wiring circuits of all types, interior and exterior lighting, approved electric water heaters (including gas-vented wiring, plumbing and water pressure systems) and electric heating of all kinds. □

communications glut

Arteries of a modern and expanding society are its communications — and in Britain these arteries are being choked off, what with telephone traffic doubling every seven years, the viewphone, conference television just around the corner, and computers waiting to talk to other computers, says J. A. Bray, director of research for the British Post Office.

To meet demands of the future, telecommunications scientists are looking to new means of coping with the rapid growth of communications services and the development of new ones, and feel they

may have a partial answer in radio wave transmission networks.

Mr. Bray says the new transmission concept calls for beaming radio waves through hollow copper tubes buried in the ground like conventional cables.

Known as the millimetric waveguide system, it can accommodate up to 400,000 telephone conversations or 250 television pictures simultaneously transmitted in a copper tube not much wider than the exhaust pipe on a sports car.

Until now the equipment to deal with the extremely high radio frequencies involved has not been available. However, says Mr. Bray, suitable electronic devices are appearing on the market and before too long he expects their price to become economic. □

If you want to get ahead . . .



... wear a hat

To absorb knowledge, not blows, was the message Electrical Utilities Safety Association field safety supervisor M. O. Shepherd spread to utility people from Haileybury to Thunder Bay as part of EUSA's annual cross-province series of accident prevention seminars.

Billed as the A (attitudes) B (behavior) Cs (communications) of accident prevention, safety specialists delved into such topics as eye protection, foot protection, communications and head protection.

At his head protection lecture in Toronto, Mr. Shepherd, extreme right, shows some of the typical types of headgear to York Hydro representatives Joe McLellan and Harold Graham.

Mr. Shepherd said that the single piece of accident prevention equipment which costs the least, lasts the longest, weighs the least, protects the most — and is the most often disregarded — is head protection. □

Task force

Ontario Hydro Chairman George Gathercole has welcomed the appointment of the Committee on Government Productivity's Task Force Hydro, announced last month.

During the speech from the throne, it was stated that the Ontario government is "determined to assure the adequacy of our energy supplies for the future. The government will ensure that the energy is used as efficiently as possible and that its use will not adversely affect the environment, health or life."

"The government will strive to maintain a choice between the various types of energy to match them with those uses for which they are best suited. To this end, the Committee on Government Productivity has been asked to review the function, structure, operation, financing and objectives of The Hydro-Electric Power

Commission of Ontario. The committee has also been asked to advise the government with respect to the long-range energy requirements of the province."

The Hydro study will be conducted under the guidance of a five-man steering committee under the chairmanship of J. Dean Muncaster, president of Canadian Tire Corporation. Other members include H. A. Crothers, president of Crothers Ltd., R. B. Taylor, vice-president and treasurer of the Steel Company of Canada Ltd., OMEA president Andrew Frame and Ontario Hydro's general manager, D. J. Gordon. R. M. Dillon, Western University's dean of engineering, has been granted a leave-of-absence to act as a full-time task force executive director and ex-officio member of the steering committee.

It's expected the task force will take about a year to complete its work.

Discussing the task force appointment, Mr. Gathercole said: "Hydro has an outstanding organization, but we face a difficult period of expansion in a time of rapid change. Inflationary pressures, environmental concerns and problems that are inevitably associated with introducing new technology and prototype equipment represent a formidable challenge to the commission. A detached – and objective – view of the commission's activities in these changing times will be helpful.

"Although it's understood that actual work or review will be carried out by a number of consulting and business research teams, the high quality of the members of the steering committee and its director ensures the studies will be both thorough and constructive," he added. □

This is your life . . .



Well-wishers

London PUC's general manager A. L. (Tony) Furanna could well have been the guest of honor on the popular Saturday night television series "This Is Your Life."

For relatives, co-workers, civic officials and cronies from the utility business across the province dropped in on him at London's Hunt Club to wish him well in his year as president of the Association of Municipal Electrical Utilities.

And most of them had the odd anecdote or two to tell as Tony and Mrs. Furanna smiled their appreciation. Among the well-wishers were Olive and Arthur Carty, a brother and sister who've been friends of the Furannas for many years. They're pictured on the left congratulating Mr. and Mrs. Furanna.

The event was the AMEU's annual president's reception, which is intended to let people know who is heading the province-wide association representing utility managers and senior personnel from about 350 municipal electric utilities. □

Partnership defended



After the dinner . . . the speeches

Ontario Municipal Electric Association president Andrew Frame has strongly defended the alliance between Ontario Hydro and its partner municipal electrical utilities.

Speaking at a recent testimonial dinner in his honor at Bloor and Spadina, Mr. Frame told about 65 business associates, friends, leaders and politicians that Ontario Hydro has often been the target of severe criticism.

But, he said, Ontario Hydro was created as a wholesaler of electrical energy to the municipal utilities – that's the role it has carried out ever since.

Mr. Frame said one of the most important bodies integrated into the OMEA is its power costing committee – the "watchdog" that keeps Ontario Hydro for all the municipalities of the province.

"It's the responsibility of the power costing committee to ensure how Hydro's costs will be passed along to the municipalities."

"We feel the power costing committee is a form of tribunal for Ontario Hydro," Mr. Frame said. Among the guests was Energy and Resources Management Minister (Maurice) Kerr, who is shown introducing Mr. Frame.

House proud

Even the most exacting housewives would look with envy at the spotless control room at the Pickering nuclear power station. Two men are employed full-time operating over-sized vacuum cleaners just to keep it clean.

It's not that control room personnel are a bunch of fusspots, but that the electronic equipment must be kept dust-free.

In addition to the two control room "charmen," four vacuum-cleaner operators are responsible for dust removal from the rest of the multi-acre plant. And with more than 2,000 workers engaged in construction and installation, that's quite a task. Particular attention is paid to reactor areas and the fuel machine vaults.

Crackdown on diggers

North York municipal council has adopted a get-tough attitude with contractors damaging underground utility lines in the borough. To enforce its crackdown, council has made pre-clearance from North York Hydro, Bell Canada and Consolidated Gas a condition of tender for firms bidding on municipal projects.

Board of Control backed the move, suggested by the works committee, after Controller Melvin Lastman charged

Contractors ignored stakeout services provided by the utilities. He said that in Metro during 1969 there were 240 breaks in underground gas lines caused by excavating equipment and 453 phone failures were attributed to work crews hitting sub-geared lines.

Contractors who undertake work for the borough council now be required to call North York Hydro, Bell Canada and Consumers' Gas every time they want to dig near utility lines.

Co-operative fund?

Ontario Hydro and the Ontario Municipal Electric Association be asked to set up a co-operative contingency fund to assist municipal utilities which suffer extensive damage as the result of natural disaster.

The move is a result of a flash summer storm which ripped through the Nickel Belt area last August leaving in its wake several dead, hundreds homeless and injured and millions of dollars worth of damage.

Sudbury Hydro, which has absorbed a \$150,000 tab to repair damage to its system, has asked for the contingency fund. Further suggested financing the fund through the cost of power through some other equitable manner of assessment."

Ontario Hydro damage in the Sudbury area during the same year amounted to more than \$1 million.

Citizen's arrest

London PUC employee, Reginald Frost, has been credited by the city's finest with the arrest of two teen-age boys in connection with a purse-snatching incident involving a 72-year-old woman.

Mr. Frost saw the pair running into the city's Springbank Park, and with other citizens gave chase. They took the purse-snatchers to the scene of the crime where they were placed under arrest by a police sergeant. The handbag was lost, although the contents contained was recovered.

Portrait of Sir Adam



of storage

Adam Beck's only living relative now has a new appointment in the family room in her Toronto home.

Ms. A. A. Bolte, a grand-niece of the "father of Hydro in Ontario," dropped into Toronto Hydro's offices one day recently and was presented by Chairman Richard R. Horkins with a 26 by 36 inch portrait of her uncle. The painting, done by Francis Seymour in 1926, was found in a storeroom at the utility. Knowing that Bolte was the sole survivor of the Beck family, Mr. Horkins informed his commission the painting should be given to her.

Attending the informal presentation are general manager Harry Campbell and commissioner Frederick Gardiner.

Public relations is....



Kissing babies helps

Reeve Kenneth Kirkby hails from the small town of Iroquois and was spokesman for the small utilities at a recent OMEA-AMEU public relations seminar in Kingston.

"Public relations to my mind," said Mr. Kirkby, a utility commissioner and a newspaperman, "means the bringing together of both the utility and its customers in a common understanding of the problems facing both parties. How this is attained varies greatly from utility to utility — and the little attention that's given to public relations by some utilities is difficult to explain."

Mr. Kirkby said that all too often commissioners tend to treat the media as meddling in something that is none of their business.

"If you want to keep on going the way you have, then stick your head in the sand, or better still stick your finger in a socket — and just hope the switch is off. That's the same kind of intelligence that is being used now by some utility people, so why change?"

"Even politicians will tell you that kissing babies helps get you elected — and even that's better public relations than some utilities are now showing," Mr. Kirkby said.

Other participants on the PR panel were W. H. Powell, general manager of Peterborough Utilities Commission, speaking on behalf of the larger utilities, and R. E. Spence, Deep River Hydro manager, speaking on behalf of medium-sized utilities.

F. R. Cross, of Nepean, shows a flip chart which he used during his portion of the program to conference co-chairman C. H. Burton, of Peterborough, and District 1 OMEA president W. Ansell Taylor and his AMEU counterpart Maurice McEwan.

Also taking part in the seminar were N. K. Manning, Ontario Hydro's Eastern Region public relations officer, and W. J. Killough, Ontario Hydro district public relations officer.

Unique concept

Bell Canada's new Belleville Technical Training Centre is being hailed as a unique concept in educational retraining for industry.

Designed to enable students to live and learn in one location, the centre, which was officially opened by Prime Minister William Davis, doubles the company's Belleville training facilities.

Close to 3,500 students will attend courses at the centre annually. The centre has eight classrooms, each equipped with film-projection equipment; six laboratories incorporating the most modern data and communications equipment; an information systems demonstration room; a television and audio-visual production studio; a computer terminal room and a library.

Courses have been rewritten or restructured to take advantage of the wide range of communications equipment while plans allow for closed-circuit TV to be installed throughout the centre.

Courses will range from orientation for new personnel to updating and continuing education for veteran employees. The

emphasis is on technical training, with some management and development courses in the offing.

More than 20 per cent of the students will come from telephone companies in provinces outside Ontario and Quebec, from the U.S. and from overseas. Already inquiries have been received from Saudi Arabia and Spain. Engineers from Turkey, Chile and Pakistan have previously been trained by Bell under Colombo Plan arrangements. □

municipal briefs

Grand Valley now has its own Hydro commission. Elected were Dr. Bruce Fife, chairman, E. A. McIntyre, secretary-treasurer, Oran Grundy, commissioner, and Grand Valley reeve Wilfred West. Previously, electrical distribution was the responsibility of a committee of council.

Collingwood Town Council has voted to buy the municipality's street lighting system from the PUC. The purchase was recommended by PUC manager W. G. Lane. Payment will be over a five-year period.

London PUC office staff are preparing to move to the new city hall. The commission is taking over two floors of the centre, leaving the old city hall and PUC building to be sold as one unit to the highest bidder.

Wingham PUC manager Harry D. Page tendered his resignation to a special meeting of the commission. Kenneth Saxton Jr., a PUC foreman for 18 months, was appointed successor to Mr. Page, who has been manager since 1969.

Former Napanee Mayor Harold Lasher has been appointed to the PUC to fill a seat left vacant by the death of commission chairman Donald Reid. Mr. Lasher was mayor in 1959-60.

It's golden jubilee year in Kapuskasing and a banner year for railway buffs because two old steam locomotives that once served the area will help kick off Old Home Week there at the end of June. One of the locomotives, engine 5107, has been loaned to the Kapuskasing Historical Association for at least a year. The other, an old Ontario Northland Railway passenger train, will be used for excursions along the Spruce Falls line during the celebrations.

Paris PUC has set aside \$10,000 to renovate its office building. One of the first things to be changed is the heating system. The boiler will be moved out and electric heating installed. Other changes will include removal of partitions to permit interior remodelling, lowering the ceiling and panelling the walls.

Attendance topped 100 at an industrial electric process heating seminar sponsored jointly by Peel and Halton county utilities and Ontario Hydro. The seminar, in Brampton, outlined methods of calculating individual power load requirements and determining what electrical equipment is required.

Percy R. Locke, who served 33 years as a member of St. Thomas PUC until his retirement in December, has been named an honorary president of the Ontario Municipal Electric Association. He was president of the association in 1962.

Wedding bells were sounded this month for A. W. H. (Art) Taber, manager of Fort William Hydro until his retirement in 1967, and Mrs. Theresa Sykes, of Thunder Bay. The wedding took place in St. Agnes Roman Catholic Church on May 1. Mr. Taber began his career with Ontario Hydro as an operator at Eugenia in 1930 and, nine years later, was named rural superintendent in Sudbury. He subsequently became manager of North Bay Hydro and in 1944 was appointed manager at Fort William. He served on the Electrical Utilities Safety Association board of directors from

1950 until 1967 and as EUSA president in 1955-56 and 1961. Mrs. Sykes is the mother of Jack Sykes, Ontario Hydro's inspector at Dryden.

Oakville PUC has decided to make presentations to employees who have served 10, 20 and 25 years. Senior staff have asked to make a recommendation about the type of award to be made.

When it comes to winning friends and influencing people, perhaps a page could be taken from East York Hydro's books. Commission chairman J. L. Christie recently commended linemen for their courtesy to a resident who had informed him about nice people who work for East York Hydro. "As the woman was on a street, she was greeted with a cheery 'good morning'. On her return a couple of hours later, polite 'hellos' were there. Says Mr. Christie: "A small thing, perhaps, but something that won a friend for East York Hydro."

Hearn gas line

The Ontario Energy Board has approved construction of a 23-in., \$6.75 million natural gas pipeline through northeastern Ontario from Toronto to supply gas to the R. L. Hearn generating station.

The 30-inch pipeline will follow Ontario Hydro rights-of-way from Markham to the plant on Lake Ontario. The line and construction of the plant's eight units to gas-firing is scheduled for completion this fall.

Originally, the line was to be 16 feet inside the western boundary of the transmission line right-of-way, but the board ruled it must be 35 feet inside. Residents of the Bridlewood and Windsor Well subdivisions had expressed fears to the board that the line was being located too close to their homes.

Fusion breakthrough

Scientists at the Los Alamos, NM, scientific laboratory have announced they've made a major breakthrough in the fusion reactor field.

A spokesman at the laboratory says the newest research to date on the effort to harness the energy of the hydrogen bomb has passed a major test.

Scientists claim they were able to use a research device, dubbed Scyllac, to produce a stream of hot ionized deuterium plasma. Deuterium, a form of hydrogen, is readily available from seawater.

In the experiment, the deuterium plasma was produced in a five-yard-long curved section of the Scyllac, which is still to be perfected.

Development of plasma in this machine is considered a major step toward a controlled fusion reaction. Fusion, or thermonuclear reaction, is the kind that provides the energy of the sun and of the hydrogen bomb.

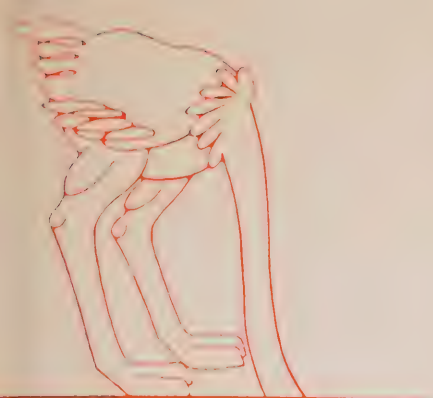
It's been said if fusion control is achieved, there's enough energy in the world's oceans to supply power at 100 times current consumption for 10 billion years. Besides that, a fusion reactor would be virtually pollution-free and produce no long-lived radioactive wastes.

Blind aid

A new electronic gadget which aids the blind in pouring liquids, like tea, has been demonstrated to a group of rehabilitation teachers.

The device, dubbed a liquid level indicator, was built in a couven workshop and is currently undergoing exhaustive testing by the Canadian National Institute for the Blind.

Powered by a "C" cell battery, it is fitted with two clips which can be attached to the rim of a cup. When the hot liquid reaches the points of the clips it acts as a conductor, completing an electric circuit which activates a buzzer.



Don Wright sees it

Old sweats in the audience may have wondered from time to time whether army has really changed all that much from the days when a sergeant major's bark only exceeded in deadliness by his sneeze and any soldier found thinking for himself, particularly on the job, could not last on 28 days in the sneezer for impersonating an officer.

Recent dispatches reaching us suggest that there have, indeed, been changes. Mind-boggling as it may be, there is actually a move afoot to unionize the army—and we don't mean the Union Army. And with all apologies to the men of old, we are going to suggest that it may be a good thing.

Consider the following situation. The grey light of dawn is just beginning to break over no-man's land. Suddenly the deadly silence is shattered by the ringing voice of a gallant colonel whose mortal words echo across the scorched shell-pocked earth: "Up and at 'em, men—give 'em a taste of cold steel."

Then he sheds a tear for the poor adjutant and must advise him thusly: "Sorry, old man, but the time is scarcely propitious for an attack. The men are working to rule, don't you know, and there's a ban on overtime."

With a bit of luck, now, the enemy will be similarly caught up in its own labor problems and by the time everything is worked out on both sides it will be time to commence negotiating new contracts.

Hopefully, under the new order of things, bargaining, the settling of grievances, strikes and work stoppages will take up all the time previously devoted to fighting. Only enough will be left over for a bit of drill and a church parade or two. Or are the winds of change wafting from the military establishment confined to our own shores. A terse announcement from London informs us that British canteens will henceforth feature go-go dancers in bikinis as well as pop music

and psychedelic lighting.

"It's not quite the sort of entertainment the boys' dads remember from the old days," an army spokesman timidly ventured in as fatuous an observation as we have heard in some time.

As we recall the military canteen of yesteryear, it offered a single attraction—glasses of green beer brewed the night before and in such limited supply that patrons were afraid to sit down. They couldn't afford the time it took to travel from table to bar with an empty glass. Instead, they formed a kind of circular conga line in front of the dispensing wicket of such a precise circumference that it was just possible to down one glass in a single revolution.

Atmosphere was provided by the sawdust on the floor and by the effect of cigarette and pipe smoke in the complete absence of ventilation. Musical entertainment consisted of the rhythmic thud of nightsticks in the hands of military policemen as they tapped out the last post on the close-cropped skulls of the inebriated.

■ And if we may continue along these nostalgic lines for just another moment, we would like to mention the recently announced goal of the General Motors auto workers in St. Catharines which is a minimum wage of \$5 an hour. As a nipper, we recall a letter Mother received from swinging Aunt Bessie in Detroit crowing about the fantastic money she was making on Henry Ford's payroll. This was a few years ago, mind you, and as we recall it she installed blinds on the back windows of the new cars as they came off the assembly line. Her girl friend polished the flower vases on both sides of the more expensive models.

Aunt Bessie later became one of the first female members of the Detroit police force, but in any event it was during her stint at Ford that the company proudly announced the \$5 minimum wage. It was the first industry anywhere to pay \$5 a day right down the line.

One is inclined to wonder how long we will have to wait for the \$5 a minute minimum.

Not too long, if we are to judge by the recent contract won by the London area plumbers, which is calculated to be worth \$345 and change for a 40-hour week. This would put an ambitious plumber in about the same bracket as a federal member of parliament—no wonder the boys on Parliament Hill are granting themselves a hefty raise. After all, a dripping faucet is a trivial thing compared with a leaky ship of state.

■ Unsympathetic as we usually are with regard to the whines and whimsies of

women's lib, we must admit the movement has a case with regard to the complaint of two topless dancers at a Toronto night spot. The girls picketed the club after the management hired two topless men dancers at \$10 more per week than the gals were getting.

"We've got more to show so we should get more pay," was the way one of the girls summed it up, and she certainly had a point. On the other hand, management claims that the male dancers increased female attendance dramatically and were worth more as a consequence.

■ In our March column, we heaped a bit of scorn on those dumb Danes who conceived the idea of packaging and selling pollution-free ice cubes chipped from the clean cool glaciers of Greenland. As it turns out, the Americans appear to be following suit.

A Maryland company has completed arrangements to import spring water from the pristine Gatineau Hills north of Ottawa and to set Newfoundlanders to work hacking hunks from the icebergs in the Labrador Sea for shipment to the U.S. in two-pound bags.

Why does the company expect Americans to shell out from 39 to 49 cents for bagged iceberg? As one company official explained, Canadian rye whisky is a big seller south of the border and the perfect host will prefer to serve it with Canadian ice—"frozen long before the Age of Pollution.

"This ice is as old as Eric the Red," he points out. "It's what sank the Titanic years ago."

Mixed with Grand Olde TNT, the ice seems likely to go on sinking people right in their own living rooms. And just to reassure us hewers of ice up here in Canada that the company's operations are not likely to denude the Arctic in the foreseeable future, it says right on the bag that there is enough ice in Greenland alone to supply everyone in the world with a two-ton block every minute for a year.

■ We had a note the other day from the manager of our Health Physics department with a few nice words to say about this column and the suggestion that the "Gaiffe" battery we referred to last month for the cure of constipation through muscular contraction must surely be spelled "gaffé"—hence the derivation of the expression—he committed a bit of a gaffe.

Could be, but as our French leaves something to be desired, we'll stick to the more common expression—he committed a fox's paw by dropping a horse's ovaries. □

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the cover

How much coal will Hydro require in the years ahead? How can a warehouse be streamlined? When should a vehicle be replaced? The esoteric equations and techniques of operations research will help to provide the answers. Feature on Hydro's operations research group begins on page 5.

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Viewpoint

Generation gap

Those of us who have been associated with the electric supply industry in this province for two or three decades are not so far removed from the pioneering days of public power that we are totally unfamiliar with its turbulent beginning and the early struggles to establish itself in the face of prejudice, ignorance and self-interest. We were able to witness a good part of the drama as it actually unfolded. Details of the earlier story came naturally in day-to-day contact with people who had known the original protagonists.

This gave us the advantage of involvement and an appreciation of the problems which had to be overcome in winning acceptance for the system of electrical generation and distribution we enjoy today. It also helped us to understand the role of electric power in the development of the province and its influence on the rising standard of living.

Less happily, perhaps, it may also have made us a bit intolerant of a generation which has grown up without this experience and in an age of protest where the constant need is to question and justify.

More than 50 per cent of the population of Ontario is under the age of 35. Power was generally available at reasonable rates across the province when these people were born. They accepted a reliable electrical service as a way of life and expected power to be available at the touch of a switch.

What do they know of the bitterness which confronted the early proponents of public power? Few are aware that electricity was initially priced so high that only the affluent could afford its advantages. Street lights were shut off before midnight, and during those evenings when the moon was expected to shine, in order to ease the strain of this exotic form of energy on municipal budgets.

Can we expect them to care? History is hard to sell in an era of concentrated development such as ours. And yet there is a need to understand the past in order to appreciate the present and anticipate the future.

At a time when progress itself is in question and some people are even calling for a halt to technology, the thoughtful will want to know something about the background in coming to their own conclusions. We hope that the series of articles commencing on the opposite page will be of some little help in this regard.

The first is chiefly concerned with establishing the social and economic atmosphere leading up to the advent of public power. Others will examine the influence of electrical availability as the province developed and consider some of the factors involved in supplying tomorrow's requirements under the rules imposed by changing values and conditions.

Ignorance of the past can scarcely be construed as virtue in those who would have a voice in charting the future. This province has been fortunate in the calibre of the people involved and the system they devised for supplying electricity. Only good can come from a knowledge of the story. □

HORSES OR HORSEPOWER

Across the world, there is a close relationship between living standards and the use of electricity.

Ontario is no exception and our present affluence is incontrovertibly linked to high kilowatt-hour consumption.

In this, the first of four articles,

Bob Morrow discusses the advent of public power in the province and its impact on the social and economic fabric.

Almost symbolically, Adam Beck looks straight ahead during parade marking the bringing of Hydro service to Berlin, now Kitchener, in 1910.



When the first "horseless carriage" glided along Toronto streets in 1893, the battery-powered vehicle symbolized a turning point in Ontario.

Electric power and the automobile eventually took different routes (which may merge again some day to reduce pollution), but these two developments were destined to transform the province's economic and social life within a few decades.

It's difficult to visualize life in Ontario around the turn of the century when the total population (2.18 million) was less than Metro Toronto's today. Farming was a way of life. About two-thirds of the population lived on 240,000 farms in the province. Most were isolated by atrocious roads and dependent on the horse and buggy. Kerosene lamps provided light.

At that time there were 700,000 horses in Ontario valued at \$80 million. The gas-powered motor car, which made its debut in 1898, not only scared the wits out of Dobbin but threatened the horse industry.

The late E. M. Ashworth, general manager of Toronto Hydro from 1924 to 1951, has left a vivid description of Toronto at the end of the Victorian era.

"In 1902, things seemed rather quiet in Toronto," he wrote. "For one thing, the city was much smaller (population 60,000) than it is now, and automobiles were so scarce that people turned around to look at them. It was in 1902 that Henry Ford first went into business on his own, and the Model-T still existed only in his dreams of the future. Telephones and electric light were used only in business and in some of the better-class residences.

"Bicycles swarmed, and riders, out for the pleasure of it, thronged to the few streets in the city where asphalt pavement was to be found. The street railway had been electrified, and a favorite outing on a summer evening was a one-ticket ride around the Belt Line.

"It was a comfortable period," said Mr. Ashworth. "All the great scientific discoveries had (we thought) been made, and little remained but to refine and develop them for the convenience of mankind."

The closing decades of the 1900's and the first decade of the 20th century were indeed a surprising era of invention and innovation:

- The first "snowmobile" was devised by a Quebec doctor in 1897. He replaced the front wheels of a motorized tricycle with runners and fitted the rear driving wheels with a metal-studded tire.

- In 1901, a crude TV-cum-picture-phone was used to transmit a fairly clear picture between Paris and Marseilles, France.

- Thomas Edison patented the first fluorescent lamp in 1896.

- Electric sewing machines, irons, heaters and stoves were available or being developed.

- The first escalator was demonstrated at the Paris Exposition in 1900.

- The first transatlantic wireless telegraph message was transmitted in 1901 and the first radio tube was invented in 1904.

- The first motion picture was projected in 1889. E. C. Drury, former premier of Ontario, recalls seeing his first movie in 1896 in the new Barrie Opera House. He wrote:

"The scenes were French: a bathing beach and a fat woman upset by a wave; French artillerymen drilling and firing their guns and a train that came rushing straight at us."

In those days, a Toronto plumber earned 27 cents an hour for a 60-hour week.



Intersection of Yonge and King streets in Toronto, was illuminated by crude-looking arc light shortly before the turn of the century. Below: Ontario Power plant under construction at Niagara Falls in 1903 and Alliston's main street around the same period. Bands around poles are to prevent horses chewing the wood.



could buy a handsome pair of boots for \$5 and a good Havana cigar for a nickel. Income taxes were unheard of.

Electricity was a luxury that few could afford in this period, but a revolution was occurring in electric power technology. All the necessary components – the turbine, generator, transformer, electric motor and incandescent light – awaited imaginative development.

In 1895, a U.S. firm harnessed the waters of the Niagara Falls, N.Y., and electricity was transmitted 20 miles to Buffalo. And in 1898, the Cataract Power Company began to transmit hydro-electric power from DeCew Falls on the Welland Canal to Hamilton area municipalities, primarily for industrial use.

At this time, Ontario had 29 cities and towns with populations exceeding 5,000. Of these, 12 owned and operated their own electrical utilities, mainly to provide street



lighting. A group of 17 cities and towns served by investor-owned electric companies included Toronto, Hamilton, Ottawa, and London, which were by far the largest municipalities in the province.

With the exception of a few places located close to waterfalls, these municipalities relied on coal-fired or gas-fired steam engines to turn the generators. As a Toronto Board of Trade committee reported in 1900, the steam engine was still considered to be "man's greatest helper." About 8,000 boilers or stationary engines were being used in Ontario, mainly by small industries.

Rates were exorbitant, however. Investor-owned companies were only interested in large customers. In 1900, the Toronto Electric Light Company, the city's only source of electric power, was charging \$60 or more per horsepower a year for 10-hour-a-day service.

Early electric service was fitful, and a number of municipalities were forced to take over the operation of small companies. Some provided lighting service only between dusk and 11 p.m., then shut down to save fuel. When a storm felled utility poles throughout Hamilton in 1898, street car service was interrupted for three months.

Even so, the electrical industry spread rapidly. By 1900, almost every city and town saw the introduction of electricity to

replace gas for street lighting, although lights were few and far between. Electric light became fairly common in factories, hotels, stores, theatres and new homes. Electric street railways appeared in most cities in the 1890's and a number of electric inter-urban railways were built.

The province's small industries, however, suffered from a serious handicap. Coal had to be imported from Pennsylvania and, when US miners struck in 1902, supplies dwindled and prices shot up to \$10 a ton.

Meanwhile, private firms were planning to develop hydro-electric power on the Canadian side of the river. At one stage, in fact, the Canadian Niagara Power Company had succeeded in getting a 100-year monopoly for the exclusive use of the river.

These factors led to a groundswell of public opinion in favor of developing Niagara waterpower for the benefit of all the people of the province instead of private business interests, which charged all the traffic would bear. "Cheap power" soon became a rallying cry across the province.

Fired up by a series of meetings in Waterloo, Berlin (now Kitchener) and Toronto, the campaign for public ownership drew support from councils, boards of trade, manufacturers' associations, trade unions and major newspapers.

The agitation for low-cost power culmi-

nated in 1906 in a march by 1,500 representatives of Ontario municipalities up University Avenue to present a petition to the Ontario government at Queen's Park.

The petition called on the government "to appoint a permanent provincial commission with power to take . . . the following action: the construction, purchase or expropriation of works for the generation, transmission and distribution of electrical power and light; to arrange with any existing development company or companies for power at a reasonable price, to be transmitted and sold by the government to municipalities or others; also to vest in it the powers necessary to enable to regulate the price at which electricity will be sold to all and every consumer, whether municipal, corporate or private."

Within two months, legislation was enacted and Ontario Hydro came into existence.

By 1910, the fledgling public power enterprise had built a 110,000-volt line, or the first anywhere, linking Dundas with Niagara Falls. Power was officially turned on in October, 1910, at Berlin, the first of contracting municipalities.

Before Hydro, electrical users paid 12 cents per kilowatt-hour. First Hydro rates averaged about six cents — a downward trend which continued for decades.

The creation of Ontario Hydro was essentially a victory for the municipalities, which formed a partnership, with the Commission as their trustee, to obtain electric energy at cost.

Initially, the municipalities banded together into power unions to champion the cause of publicly-owned electric power. The largest of these was the Niagara Electric Power Union.

Eventually, in 1912, the Ontario Municipal Electric Association was formed to safeguard the Hydro interests of the municipalities and to promote the successful operation of Ontario Hydro's partnership. Today the OMEA, composed primarily of electric commissioners and mayors or reeves, represents about 350 municipal electric utilities in the province and takes an active part in shaping Hydro policy.

The foresight of these pioneers in creating the Hydro enterprise supplied the main ingredient for a well-endowed province — an abundant supply of low-cost power and cleared the way for the social and economic transformation of the province in the next 60 years. □

World's first practical street railway system demonstrated at the Canadian National Exhibition grounds in Toronto in 1884. See also article on Ontario invention, page 8.



THE NUMBERS GAME

by Bill Settatree



He was a distinguished looking, academic sort of man . . . not at all the kind of person you'd expect to see at the gaming tables. Yet he rolled dice and chalked numbers on a blackboard. He rolled them again, and again, each time marking down the numbers.

They weren't just ordinary dice, and the man wasn't playing a game. Each of the dice had 20 sides bearing the numbers 0 to 9 and Bill Shelson, who heads Ontario Hydro's operations research group, was engaged in a study of fuel requirements for the years ahead.

While the dice-rolling incident might appear to the casual observer to be a sort of scientific crap game, it was a demonstration of the basic design for a computer program in which probability is taken into account.

Mr. Shelson was using the dice to show how a mathematical model simulates the number of times in an eight-year period that fuel shortages might be expected. The final answer was reached only after hundreds of cases were incorporated in the computer calculations.

The studies, done in collaboration with Hydro's power systems division, took into account variations in output from hydro-electric stations, variations in estimated power demands, carrying charges for coal, alternative sources of energy and the consequences of power shortages. Such potential problems as fire losses and strikes were also considered.

A series of tests indicated that under one particular policy, in 800-year periods, Hydro would experience an over-supply of fuel 288 times and an under-supply 224 times. A more satisfactory policy resulted in over-supply 26 times and under-supply 36 times.

But fuel studies are only one aspect of the work in operations research. The group was established on an experimental basis in 1955 to study Hydro's vehicle replacement policies. Since then, it has grown in size and scope. Its services are available to any branch of Hydro and studies have been carried out on many facets of the Commission's work.

Using Monte Carlo technique involving set of dice and book of a million random digits, are Amrit Punhani, Bill Shelson and David Youston. In other photos, Mr. Shelson turns to the blackboard while Doug Wilson (seated) and John Webster extract data from computer display. This type of equipment may be used to replace computer cards and control slips in future warehouse operation.



Almost all studies are undertaken upon the initiative of managers who are aware of important problems and see operations research as a means of providing a scientific basis for their decision-making.

Operations research is becoming more and more important in business, industry and government. Its techniques are being employed by the planners of airports, freeways and shopping centres to determine the best layout, and ensure uncongested traffic flow. Operations research can also develop a production control system for large factories or schedule a world-wide fleet of oil tankers.

One company even employed its methods to determine why too many bananas turn brown before they reach the grocer's shelf. An equation simulating an average banana was fed into a computer with other data. Heavy losses were eliminated when the information was analyzed and recommendations put into practice.

The Ontario government is using operations research in many ways including its recreational planning. Other adherents include such major organizations as Shell Oil, Cominco, Canada Packers and Air Canada.

The various techniques of operations research carry exotic names such as decision trees, operational gaming, Monte Carlo method (that's rolling dice), input-output

analysis, linear programming, optimization, dynamic programming and industrial dynamics.

Ontario Hydro's operations research group is located at the Dobson Research Laboratory in Etobicoke. The full-time staff consists of Mr. Shelson, who was a stress analyst originally, and four other professionals whose backgrounds include statistics, mathematics, business administration and engineering.

Ontario Hydro's operations research group is often augmented by other staff and line personnel such as industrial engineers, economists, supply experts and electronics engineers. Trainee engineers and summer students also work with the group from time to time.

The group makes extensive use of electronics computers such as the IBM 360/65 and Univac 1108. Without such machines, the scope of the work would have been restricted because extensive computation is generally required both in the solution of mathematical models and for data processing.

"But we don't push computers," says Mr. Shelson. "If you can solve a problem using a pencil and paper and ordinary arithmetic, this is the way to do it."

In the past 16 years, the operations research section has handled a variety of projects ranging from vehicle replacement to pre-

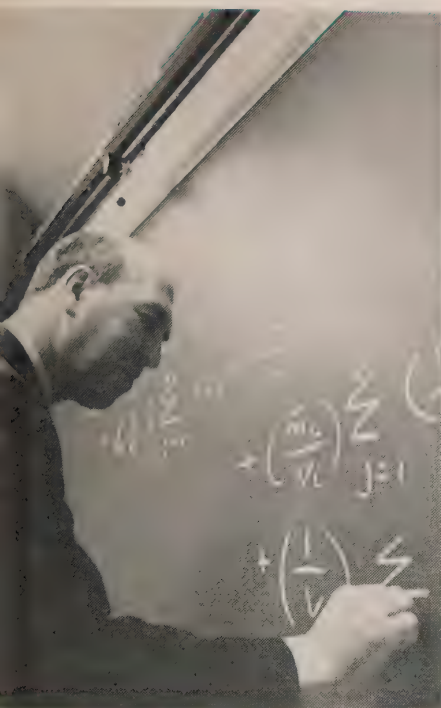
dicting lake levels. The group also plays a valuable part in projections which determine the future scope and size of a new central stores complex.

Some of the studies on which the group is currently working are the development of an advanced materials system for regulating the flow of material from central stores and suppliers, the fossil fuels study, a project using statistical methods to evaluate ways of controlling growth along Hydro rights-of-way without harming the environment, a study of the effect of storage on Lake Erie levels and the allocation of construction equipment at generating station sites.

Work is almost always performed on a team basis, with members of different scientific backgrounds devoting their full time to the project. The team includes not only operations researchers but also highly knowledgeable staff provided by the commission for whom the study is being done. This diversity of talents enables the team to survey the problem from many viewpoints and ensures that all the skills required to solve the problem are available, as well as encouraging critical analysis of possible solutions before submission to management.

At least three separate studies were undertaken for Hydro fleet management to determine and improve vehicle replacement policy. Hydro operates about 4,000

operations research may show
that even lemons are really peaches,
and that bananas are not so rotten after all.



and trucks worth about \$25 million. Mr. Shelson estimates that the development of a co-ordinated policy in this area has cost Hydro substantial sums of money over the years, both in the trade-in of vehicles and in maintenance.

"We made some interesting discoveries," Mr. Shelson says. "For instance, we found that the so-called lemons sometimes turned out to be better performers than the peaches over an extended period of operation."

The research group established a trade-in policy that took into account such factors as mileage, age, costs of operation, capital costs, normal depreciation, and delays due to vehicle breakdowns.

A schedule was published which equated vehicle age with age and mileage and suggested a replacement time. Periodic reports have been made to keep pace with changing conditions, and the next study is expected to consider a prestige factor for the replacement time.

"Not only are we concerned about the appearance of Commission vehicles, but we must think also of the morale of the individuals using our vehicles," Mr. Shelson adds.

A joint research study with operations research dealt with the economic dispatch of power. This study resulted in potential savings of between \$1,000 and \$2,000 a year in the operation of thermal-electric

stations and Hydro's interconnections with the U.S.

Two major studies stand out in Bill Shelson's mind. One was concerned with the flow of water over Niagara Falls and the other dealt with Hydro's warehousing policy.

The Niagara Falls study was in connection with water flow through the Sir Adam Beck power stations and the requirement by international treaty that specific amounts be allowed to flow over the falls during the tourist season. Detailed analysis helped to show the best methods for economically controlling the generating stations' water consumption while adhering to the regulations.

Operations research is also playing a major role in warehousing plans. Hydro is a major user of all types of supplies from pencils and paper clips to electrical equipment weighing many tons. In fact, more than 10,000 different items are kept in quantity at the central stores in Etobicoke and about 100 smaller warehouses across the province.

As a result of one operations research study with supply division, Hydro was able to reduce its inventories by \$4,585,000, resulting in annual savings of over \$300,000.

Plans have since been formulated for a new central stores and Mr. Shelson estimates further substantial savings will result.

In a warehousing operation, paperwork is a time-consuming task. Operations research is studying the use of television monitors to replace computer cards and control slips. If successful, the method may be employed in the new warehouse. A controller could then push a button for information on a particular item, turn to the television screen for the results, and then enter his decision instantly in the computer's memory banks. No fuss, no muss, and no paper.

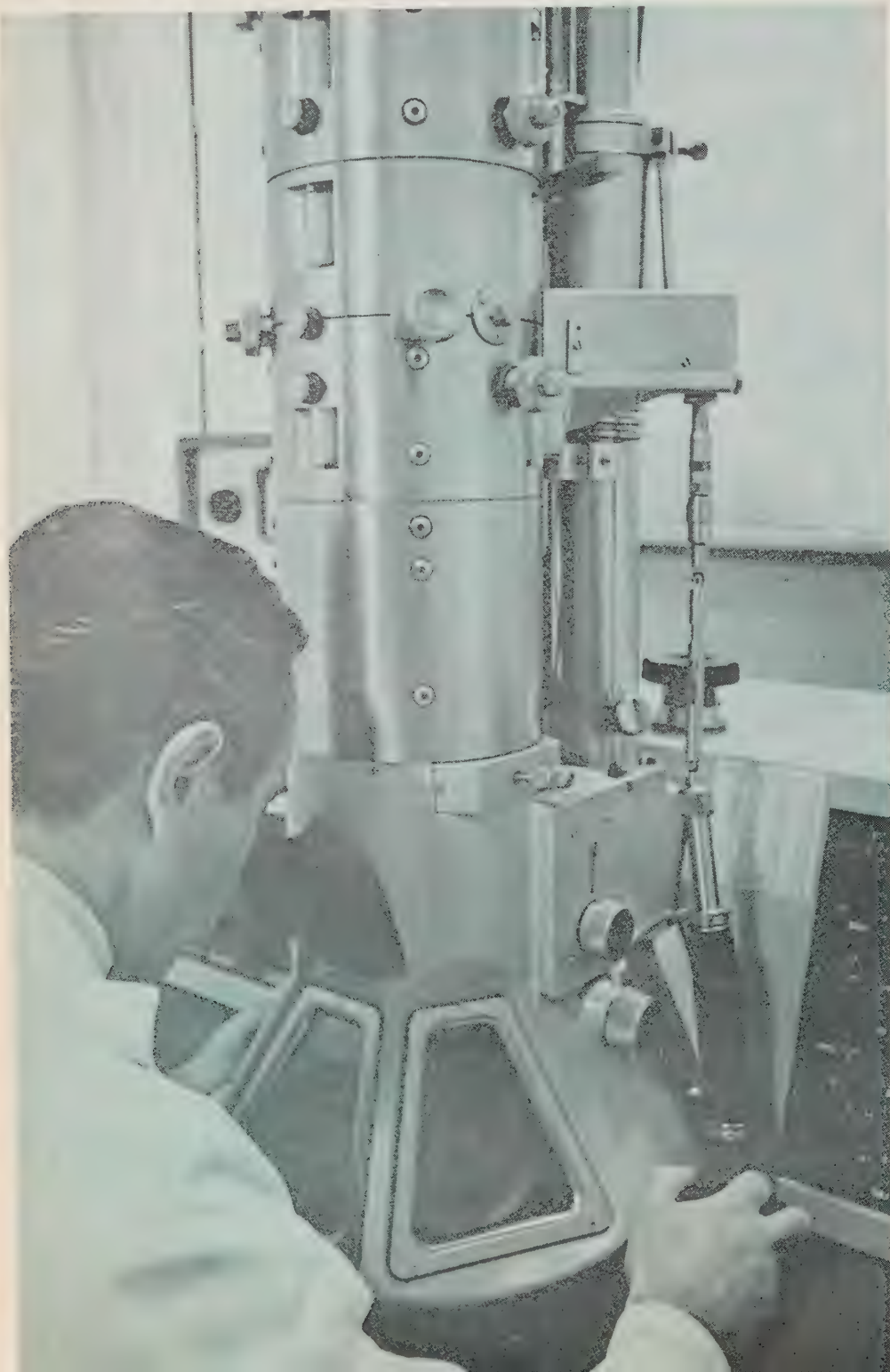
With so many studies in progress, Mr. Shelson meets each morning with his colleagues to discuss their work. The group has even employed operations research techniques in their daily toss-up for coffee.

The normal "heads" or "tails" routine is out of date as far as they're concerned. Employing the Monte Carlo method and a scientific tome entitled "One Million Random Digits," they select at random a digit to determine who buys.

"We kept track of this for a year and found that each of us came out about even," Mr. Shelson adds.

From 10 cents to millions of dollars, Hydro management decisions are being helped every day by the practical application of the numbers game. □

pardon us if we boast, but... Ontario can lay claim



What does a paint roller have in common with a jetliner, or an electronic wave or share with the game of basketball? Not too much, it appears at first glance... except that all were developed in Ontario.

Every good schoolboy can no doubt tell you that in 1921 Ontario gave the world insulin for treating diabetes, thanks to research efforts of Toronto doctors Frederick Banting and C. H. Best. Or that Alexander Bell completed the first long distance telephone call between Brantford and Paris in 1876.

But there's a remarkably long list of other world-firsts developed in the province ranging all the way from apples to zip ties and from the electron microscope to baby foods. Surprisingly, most of these achievements are given little, if any, mention in popular reference books.

But neglect is not confined to the history books. The chronicle of Ontario inventiveness is also a story of general reluctance by industry and government to support new developments with hard cash.

It was true in 1869 when Toronto dentist J. W. Elliott reluctantly returned to pursue his teeth after failing to gain financial backing to develop his patented rotary snowplow for clearing railway tracks. And it is just as true in 1971 as Toronto chemistry professor Dr. J. E. Guillet seeks Canadian capital to develop his patented plastic which disintegrates in sunlight — perhaps an answer to the mounting problem of the so-called disposable bottle.

From the earliest days, Ontario's vast size and the problems of moving around in its rigorous climate and terrain have led to innovations in transportation. Railroads throughout North America and Europe eventually came to use the snowplow based on Elliott's concept, with the first working models turned out in 1883 in the Orangeville machine shop operated by the Leslie brothers.

by Paul Chisholm

*Forerunner to powerful electron microscopes
like this one on the left was developed in Toronto
in 1938 by James Hillier and Albert Prebus.
First civilian jet was built in Ontario and flew
between Toronto and New York in 1950.*

ong list of inventions from the paint roller to the jet liner



A sled-like boat powered by a rear-mounted propeller was developed in Georgian Bay by Malcolm Dion shortly after World War II for use on ice and in water. Ontario Hydro was one of the first to make use of the craft, known as the Scoot, because of its usefulness in servicing rural areas in winter.

Later came the Jigger, a tub-like fibreglas vehicle fitted with six, low-pressure balloon tires. Developed for off-road work by John Gower, of Rexdale, in 1958, it proved as maneuverable in muskeg as it is on steep, rocky inclines.

But Ontario's greatest contribution to transportation was undoubtedly the electric street railway. The first practical system in the world, developed by John J. Wright, was demonstrated at the Canadian National Exhibition in Toronto in 1884.

And even that arch-inventor Edison may have been preceded in his experiments with the incandescent lamp by Henry Woodward, a Toronto medical student. A story in the Canadian Electrical News of February, 1902, claims that Woodward and an hotel keeper named Evans built a lamp containing carbon electrodes and filled with nitrogen gas several months before Edison filed his patent in 1879.

In aviation, rugged little aircraft capable of taking off and landing in restricted areas such as bush strips or lakes have been Canada's best-known contribution. DeHavilland Aircraft of Canada, of Downsview, has been foremost in this area, and its aircraft are seen today in skyways around the world.

None of these aircraft, however, had as much initial impact as the first commercial jetliner designed and built in North America. Sadly, this Ontario development was not even to win a place in an aviation museum, let alone go into full production.

"First Jet Liner Seen Here Flies From Toronto In Hour," said the front page of the New York Times of April 19, 1950, acclaiming the aircraft's triumph in reducing the flying time between the two cities by half. Hundreds of spectators gathered at Idlewild airport to see the landing of the Jetliner, which won further plaudits from aviation writers, test pilots and the American air force.

Built by A. V. Roe Canada Ltd., Malton, and designed by James Floyd, who came to Ontario from England, the Jetliner appeared to have much going for it. It was said to be a simple aircraft, had few problems in two years' testing, required minimal maintenance and the cost was low.

One U.S. airline was prepared to order four Jetliners and the American air force showed interest. But the aircraft failed to



meet the exacting technical specifications required at the time by Trans-Canada Airlines (now Air Canada) and the Canadian government opted instead for Britain's trouble-plagued Comet, which had taken to the air just a few weeks earlier.

A.V. Roe was ordered by the government to concentrate on building fighter planes for the Korean war, and work on the second Jetliner was halted. It was small consolation to its designer that he became the first non-American to win the coveted Wright Medal for his Jetliner design.

One little-known Ontario contribution to aviation is the gravity suit. A forerunner of the familiar pressure suits used by today's astronauts, it was developed in 1941 by Dr. W. R. Franks, of the University of Toronto, a leading authority on the effects of acceleration and deceleration on pilots in fighter aircraft.

In the underwater world, Toronto's Spar Aerospace Products makes a decompression computer developed in Ontario that predicts the amount of inert gas absorbed by a diver. It allows him to undergo decompression at the maximum rate without risk of contracting the bends.

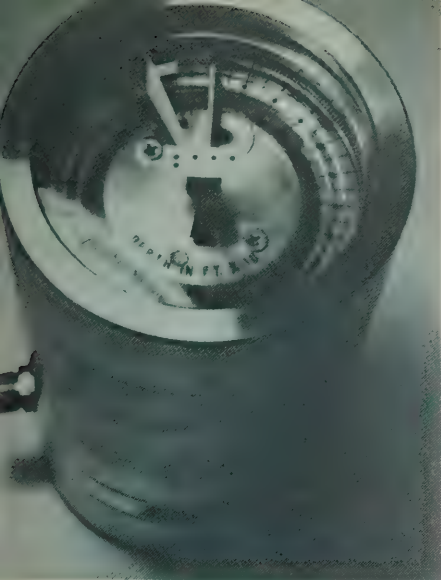
G-suits not excepted, no form of hard-

wearing clothing – or mod styles for that matter – would be complete without the zipper. Much of the development work on the modern version, successor to the old slide fastener, was carried out in the 1940's by Dr. Gideon Sundback, chief engineer of the Lightning Fastener Co. of St. Catharines. He also designed several machines to manufacture zippers.

Although Ontario may not be known for international gastronomical delights, it has made an important contribution to culinary arts. The world's first electrically cooked meal was served to dignitaries at an "electric banquet" in Ottawa in 1898.

Ontario, though, does have one claim to a distinctive food. Much to the delight of many a distraught mother, Pablum, the first pre-cooked cereal for babies, was developed at the Sick Children's Hospital in Toronto, in the early 1930's by Dr. Frederick Tisdall, Dr. Theodore Drake and Dr. Alan Brown.

More to the adult palate, apple-munchers around the world owe a bite of gratitude to a St. Lawrence Valley farmer named John McIntosh, who in 1796 developed the rosy red apple which bears his name. A commemorative plaque erected at the site of the parent tree in Dundela is now



Basketball, a decompression computer for divers and the electronic wave organ . . . all had their beginnings in Ontario.

ated in Upper Canada Village, where it
s moved before the valley was flooded
expand the St. Lawrence Seaway system.

ore important Ontario contribution to
iculture, however, is spring-ripening
rquis wheat. Developed at the Dominion
perimental Farm in Ottawa in 1903 by
Charles Saunders, a native of London,
t., it brought prosperity to the Canadian
iries and won world-wide acceptance
ause of its superior milling and baking
ilities.

he realm of sport, Indians living in
at was to become Ontario gave the
ite man the distinctive game of lacrosse.
ay, the game is played in many parts
he world, but its popularity is far short
another sport devised by an Ontarian
asketball. It was invented in 1892 by
James Naismith, a native of Almonte, 30
es southwest of Ottawa, who was
aching physical education in Springfield,
ss., at the time.

other Ontario sporting contribution
is the spring-action starting gate for
se races. The earliest version was in-
eted by Quebec-born racing reporter
Tip McGinnis, who established a manu-
ruring plant in London, Ont. Until
placed by the electric starting barrier, the
e was exported widely.

technology, one of Ontario's greatest
ntive geniuses was undoubtedly
Thomas L. Willson, born in Woodstock in
181. He pioneered many developments in
use of the electric arc furnace, and
one of Canada's first dynamos in the
t of Hamilton.

Willson was the first to commercially pro-
duce carbide and acetylene gas, the un-
ditional result of experiments he con-
ducted in New Jersey in 1892 to find a

new process for manufacturing aluminum
in an electric furnace. He sold the patents
to the Union Carbide Co., returning to
Canada to open his own carbide and
acetylene works near St. Catharines.

Acetylene proved to have its greatest
application in the oxy-acetylene torch for
welding and cutting metal. But Willson
and others made a strong bid to promote
the gas for street lighting before electricity
won the day.

The sophisticated automation techniques
used in today's modern factories owe
many of their origins to the inventiveness
of E. W. Leaver and G. R. Mounce, who
built the world's first automatically-
controlled machine tool in Toronto in 1947.
The programmed, hand-arm machine,
which could turn out a job equivalent to a
skilled man at a lathe, attracted wide
attention but little financial backing. The
two men patented their method of doing
the job, but others promptly developed
alternative approaches.

A milestone in publishing was achieved
in 1869 when George DesBarats and
William Leggo, of Ottawa, developed the
first practical method of making half-tones
by re-photographing pictures through a
fine screen. The two men published the
Canadian Illustrated News, the first publi-
cation in the world to use the method.

And in 1927 there was another important
step in mass communications — the de-
velopment of the AC tube that enabled
radios to operate on ordinary household
electric current without an ear-shattering
hum. Until Ted Rogers, a University of
Toronto engineering drop-out, produced
the first commercial tube, household radios
operated from bulky batteries.

As radio tube technology developed in the
1930's, many inventors were striving to
develop a compact electronic organ which
could simulate the sounds of a mighty
church organ. But ahead of them all was
Morse Robb, of Belleville, who developed
the world's first electronic wave organ
in 1927. It reproduced the actual sound of
an organ pipe.

Using a special home-made camera, Robb
developed a technique to "photograph"
the wave forms as they appeared on an
oscillograph, cutting the pictures of each
note into a revolving drum. With the aid
of an electro-magnetic pick-up, the series
of electrical impulses was played through
an amplifier and reproduced as sound.

Robb's organ attracted wide attention
and was patented in Canada, the U.S. and
England. Although such companies as
General Electric were interested in manu-
facturing it, Robb went into production
himself at Belleville. Several models were
produced before the venture failed — partly
the result of inadequate financing, but
also because it was tough work selling
organs in the depression.

No summary of Ontario know-how would
be complete without mention of the paint
roller, perhaps the most important single
contribution to the world of do-it-yourself.
It was invented and patented in 1940 by
Norman Breakly, of Toronto, who failed to
raise sufficient capital to fight patent
infringements, let alone go into production
on any large scale.

Breakly's experience typifies the all too
familiar story of the response to Ontario
inventiveness. But despite the timidity of
the entrepreneurs, Ontario's record of com-
ing up with new products and techniques
is an outstanding one.

a place to go



rio—is there any place you'd rather be?

ays the message in the Department of
e and Development's catchy promo-
l campaign geared to inform television
ers the length and breadth of Canada
e advantages of living in the nation's
thiest province.

rio Place, an entertainment and ex-
on complex of islands, lagoons, canals,
s, beaches and buildings of daring
ative architecture, is also designed to
strate the quality of life in Ontario.

Over two years ago, there was only
r where the \$23-million Ontario Place
stands opposite Toronto's Canadian
nal Exhibition grounds. But today,
assembly can see the space-age sil-
ettes of the five-pod Ontario Place
rion, the domed Cinesphere theatre,
he 46 acres of landscaped islands that
riture the new exhibition showcase
ntario and its people. The entire
lex occupies 96 acres of land and
n, the islands being formed from about
million cubic yards of fill from Metro
to excavations.

n Prime Minister William Davis offi-
opened Ontario Place last month,
to 30,000 trees, shrubs and plants
in the man-made ground, 17 acres of
had been sodded, 3¼ miles of path-
constructed and a mile-and-a-half
aches graded and contoured.

phere, an 800-seat, dome-shaped
re, dominates the west island. One of
most advanced theatres in the world,
0 feet high, 110 feet in diameter and
es a 60 by 80-foot screen.

ps the most significant part of
phere, however, is its sophisticated
tion system, capable of handling all
ot film, from 16 mm, through 35 and
n, all the way up to the Ontario-
oped Imax system whose image fills
the screen. Each frame of film in the
system is three times the size of
and 70 mm movies and is fed hori-
tally through the projector instead of
vertically. The projector has a 25,000-watt
light four times brighter than any com-
mercial picture lamp—and the system
is air-cooled. The theatre has a 24-
channel stereo sound system with 57
speakers.

and an 8,000-capacity outdoor
theatre, is located on the east island
people will listen to concerts by the
Toronto Symphony, watch performances
of the National Ballet, hear pop, rock, and
country music. The stage, which is 75
feet in diameter, is styled after the classical
theatre-in-the-round.

Rising spectacularly between the two
islands is the Ontario Place Pavilion, con-
sisting of five modular units, or "pods,"
suspended above the water from 105-foot
steel columns. In four of the five pods, a
mixed-media exhibition tells the story of
Ontario and its people, from its early geol-
ogy to today's technological society.

Nestled in the gentle lagoons created by
the formation of the islands is a 300-slip
marina, one of the largest and best equipped
on the Great Lakes. It's capable of accom-
modating boats up to 40 feet in length.
The surrounding waters are considered
excellent for sailing and will be the venue
for the Finn Gold Cup Championship in
October—the first time the contest has
been held in Canada.

Providing excellent protection for the
mooring basin is a quarter-mile long sea-
wall promenade created through the sinking
of three retired Great Lakes freighters. The
bridge on one of them has been left intact
to create a vantage point from which to
look out over the lake or to see the Toronto
skyline.

A flexible electrical distribution system is
the key to ensuring a plentiful supply of
power for Ontario Place, says J. Howard
Stock, the engineer who designed the
power system and lighting equipment for
the showcase.

Power enters along cables located in the
main entrance bridge and is fed to three
substations located in Cinesphere and the
east and west islands. Secondary distribu-





tion is at 600 volts to accommodate the distances between distribution centres and to feed air-conditioning, heating, ventilating and pumping equipment.

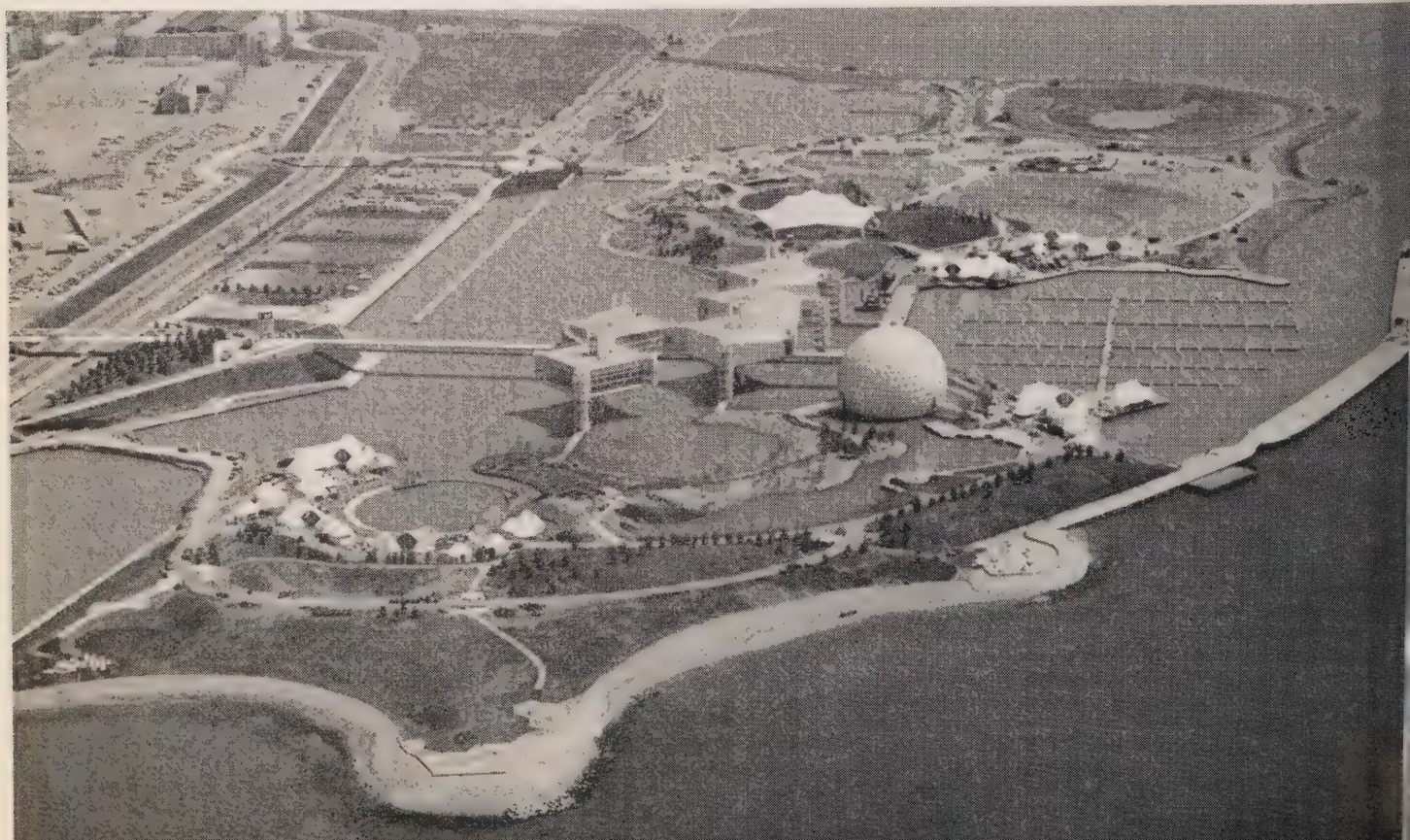
The system is designed so that major power failures, short of an outage at Toronto Hydro's CNE substation, can be expected to last less than an hour.

A separate 32-volt battery-operated system is provided in each building to power emergency lights in the event of a failure. This eliminates the need for elaborate sensing and switching equipment as would be required for a single system serving the whole complex.

When former Prime Minister John Robarts first announced the provincial show on March, 1969, he said: "The new project was created to impart to all Ontarians a sense of identity with, and pride in, the accomplishments of their province."

Is there any place you'd rather be? □

Cinesphere is easily identifiable by day or by night, as these photos show.



the armor-plated, automated, ELECTRONIC GLASS HOUSE



As a boy, in his native Holland, Peter Van Tuyl dreamed of the day he'd have his own greenhouse — even though he'd never set foot inside one.

Not even in his wildest dreams did it ever occur to him that close to four decades later he would own the first fully-automated tomato "factory" in far-off Canada. Nor did he ever imagine that his greenhouse would cover two-and-a-half acres.

But that dream has become reality and the Van Tuyl greenhouse at Norval is the nation's biggest glassed-in tomato farm.

It took 130 tons — 16,900 panes of 32 ounce glass, 16 miles of heating pipe and an equal amount of piping for irrigation to build Peter Van Tuyl's dream. He used 32-ounce glass rather than the usual 24-ounce variety to lessen breakage risk. The thicker glass is capable of withstanding both hailstones and heavy snow. As a matter of fact, rain falling on the glassed-in acres is drained into a central system and piped to an 18-foot deep pond containing more than 2,000,000 gallons of water for the 25,000 thirsty tomato plants. Melting snow is also collected and stored. Although the greenhouse isn't electrically heated, it incorporates the latest in electronic control systems.

The outside temperature really doesn't matter to the three Van Tuyl employees because automated electronic systems keep their work area at a comfortable 68 degrees. Sensors amid the plants operate controls that open or close an effective 35 per cent of the roof area for ventilation purposes. Irrigation cycles, too, are set for automatic operation for any volume of water at any interval. Even fertilizer is measured and dispensed at the flip of a switch.

But perhaps the most significant innovation is an automated pollination system which could mean substantial savings in time and efficiency.

Under natural conditions outdoors, pollen is shaken from the plants by the action of winds. But in Peter Van Tuyl's greenhouse, an electrically-operated wheel with an off-centre peg jiggles wires attached to the plants and gently pollinates the blossoms.

Peter Van Tuyl has not achieved his dream without difficulty. His first greenhouse, built near Sarnia, was destroyed by fire. That same year he was in the hospital with a prolonged illness. But he rebuilt, sold the enterprise and moved to Mississauga. He still has greenhouses there, but has switched from growing tomatoes to chrysanthemums. He started building at Norval last fall.

Mr. Van Tuyl says he knew "absolutely nothing about tomatoes, or for that matter flowers," when he started his tomato business 20

years ago. And he owes the success of the electronic control system to a close friend, electrical contractor Gerry Van der Veen.

"All the electronic equipment was designed in Holland and most of the precision parts were manufactured in Switzerland. There were no engineering plans whatever — not even one word on paper," Mr. Van Tuyl says.

Says Mr. Van der Veen: "I just had to

improvise as we went along. At times, we had to start in what would normally be the middle of a job just to work toward either end. But it worked out okay. Peter's harvesting tomatoes, and that's what he wanted. . . ."

And what a harvest! His first plants went into the rich soil on January 15. The last week in March, the crop was being sold at fresh produce stands ringing Metropolitan

Toronto. He hopes to harvest two full crops a year — perhaps as much as 500,000 pounds of delicious tomatoes.

Twenty years ago, Peter Van Tuyl knew nothing about tomatoes and even less about flowers. But he had the desire to make a boyhood dream come true. Now there's virtually nothing he doesn't know about either. □



Peter Van Tuyl also grows chrysanthemums under artificial light in an older greenhouse. He is left, demonstrating a less automated way of pollinating tomato plants with a battery-operated shaker. Girl is packing ripened tomatoes for markets in the Toronto area.



MAN *versus* **MACHINE**

by Rae Hopkins





Welding rods indicate to Vic Clague, above, where a cable conceals an electric cable. Time domain reflectometer, left, is the more conventional method of detecting cable breaks. Cable appears as a line on the cathode ray tube.

Some were doubters.

But even those who were doubters showed signs of having misgivings about their misgivings when two copper rods began to move inward — then crossed — as the dowser paced slowly over the area where an electrical distribution cable was supposedly buried.

The "witcher" was Scarborough PUC's line construction superintendent, 62-year-old Vic Clague.

Mr. Clague started using divining rods to find buried cable about eight years ago. Since then, automation has pretty well replaced his L-shaped welding rods. But he's ready to match his skill anytime against modern cable-detection equipment.

Like that windy afternoon in April when the streetlights failed in one of the borough's newer subdivisions. A PUC van packed with sophisticated electronic gadgetry arrived on the scene. So did Vic Clague, his welding rods lying beside him on the front seat of his truck.

Craig Gartshore, who earns his living as a cable tester with the utility, readied the Time Domain Reflectometer (TDR) equipment. It works something like a radar set sending out impulses that detect the presence of an underground cable. The cable is displayed as a line on a cathode ray tube and any break is readily apparent.

"It sounds rather complicated, but really it's very simple," said Mr. Gartshore. "You just take a linear measurement on the ground, check it against your reading on the monitor, do a little multiplication, and you know where the fault is."

With that, Mr. Clague adjusted the set of his yellow hard hat, picked up his two-foot-long welding rods, set his weathered jaw and started to pace the mud between a couple of lamp standards.

He'd gone but a few steps when the rods, held securely but not too tightly, began to move inward. Another step or two and they were crossed in front of his chest.



"She's right under here," he said of the cable.

Craig Gartshore donned the earphone and picked up a gadget looking something like a bathroom plunger and marched the same route just traversed by Vic Clague. As he swung the instrument gently back and forth, a constant beep in his earphone indicated he was over the cable. When he came to the break, the beeps ended.

Up to now, Vic Clague had never tried to find an actual break. But he wasn't afraid the challenge. As he walked along the route he'd previously located, his crossed wires suddenly straightened.

"I'll be damned," he said.

The van, and Mr. Clague, moved to another subdivision. A residential customer was without power. The TDR located the fault underneath a concrete slab near the house entrance. So did the divining rods. And Mr. Clague found the fault a second time.

Use of the divining rod is far from new. As far back as 1568, St. Teresa of Spain was offered a grant of land if water could be found on it. She promptly took a hazel wand, divined some water and established a convent there.



Wielding business end of the time domain reflectometer, Craig Gartshore follows path of underground cable. Once break is located, centre digging can begin. His divining done, Mr. Clague looks on while transformer is checked out.

Even before that, the divining rod was used by prospectors for minerals in Germany's Harz Mountains.

Mr. Clague doesn't know how the divining rods locate underground cables, nor does he know why some people can use them and others cannot. His theory is that the rods are drawn together by the magnetic field surrounding the current-carrying wire, but he's at a loss to explain how water is divined.

It was through "witching" for water with a friend that Mr. Clague, who began his career with Scarborough PUC nearly half a century ago as a groundman driving a team of horses, first learned to use the divining rods. They'll pick out a broken cable "even through 10 feet of snow," he says.

His first try was in an area which used to be called St. Joseph on the Lake. PUC line crews had installed underground wires for a new subdivision, then filled in the trenches. For some reason crews were later unable to locate the cables, and it was then that Mr. Clague thought about his two welding rods.

They worked, and he's kept them handy ever since. □

along hydro lines

Manager retires



Art Fort



Kenneth Lusty

Art E. Fort retired recently as manager of Port Colborne Hydro after 47 years in the utility business. He was succeeded by Kenneth Lusty, with the commission since 1962.

Mr. Fort started as a line crew member at Simcoe in 1924 and worked his way up to electrical superintendent. He moved to St. Marys as PUC manager in 1948 and five years later went to Port Colborne as engineer. He was named manager there in 1959.

Active in sports, Mr. Fort once played on Simcoe hockey, baseball and soccer teams. During the Second World War, he went overseas as a captain with the Canadian Army and was discharged in 1945 with the rank of major.

During his 18 years at Port Colborne, Mr. Fort was active in community organizations, including the Operatic Society, Lions Club (past president), Royal Canadian Legion, Red Cross (past president and chairman of the blood donor clinic), St. James Church choir, Curling Club, Golf Club and Chamber of Commerce.

A surprise retirement party was attended by representatives of the AMEU, OMEA, Ontario Hydro and four members of the Hydro commission which hired Mr. Fort in 1953. □

Back to school

Waterloo PUC has completed a highly successful eight-week training program for employees. About 50 people attended the course, which was presented in co-operation with Conestoga Community College in Waterloo and held partly after working hours.

The instructors were mainly senior members of the PUC staff, including manager I. L. Bradley and treasurer D. J. Black. William

Moyer, announcer for radio station CHYM and author of "Wat Country Diary," lectured on the history of Hydro.

The course also covered the relationship between Ontario Hydro, the OMEA, the AMEU and the community, distribution and transmission, financing, sales and load building, metering, data processing and public relations.

Gerald Knorr, supervisor of sales, said the course had been valuable in familiarizing employees with the different PUC departments. Question-and-answer periods were popular and ran within the allotted times.

PR appointments

Two assistant public relations officers have been appointed to Ontario Hydro's Central and Eastern regions.

J. Alan Fulton, 38, public relations officer at Pickering nuclear power station for two years, has been appointed assistant public relations officer for Central Region.

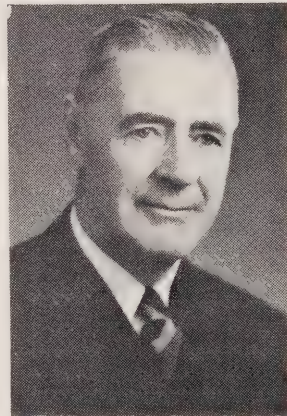
Jack Muir, film and equipment technician at Head Office, becomes assistant public relations officer, Eastern Region.

Mr. Fulton, who was born and educated in Toronto, joined Hydro in 1965 and served three and a half years as field representative and guide at Lakeview generating station before moving to Pickering.

Mr. Muir, a native of Port Elgin, joined Hydro in 1966 and served one year as senior guide on the Pickering project before moving to Head Office.

Pat Kelly, who was born in Cornwall and joined Hydro in 1966, becomes PRO at Pickering. He has been involved in public relations work at the Robert H. Saunders-St. Lawrence station, Nuclear Power Demonstration plant at Rolphoton and the Nuclear Power Development.

Former Toronto Hydro chairman



Bertram Merson

Bertram Merson, former chairman of Toronto Hydro and a past president of the OMEA, died last month in Toronto at the age of 82. When he retired in 1965, Mr. Merson had been a Hydro commissioner for 19 years and chairman for 12, guiding the utility through a period of expansion.

Mr. Merson served a two-year term in 1958-60 as OMEA president. For many years he was chairman and secretary-treasurer of the pension insurance committee.

He came to Canada in 1907 from Somerset, England, and played an active role in labor and civic affairs.

First employed as a street car conductor, he was president of the Street Railwaymen's Union from 1918 to 1925, vice-president of the Trades and Labor Congress of Canada from 1923 to 1925 and president of the Toronto and District Trades and Labor Council for three years.

Mr. Merson was labor delegate to the Geneva conference in 1926, secretary of Toronto's Mothers' Allowance and Old Age Pension boards, member of the rationing board of the War Prices and Trade Board in World War II, and labor advisor to the federal Conservative party for three years before his appointment as a Toronto Hydro commissioner in 1946.

An active Anglican layman, he was a past president of the Diocesan Social Service Council and also served as an assistant director of the Canadian National Exhibition. Mr. Merson had two sons, Victor and John, both of Toronto; a daughter, Beatrice, of Toledo, Ohio; and a sister, Ida, of California.

Threat to British elms

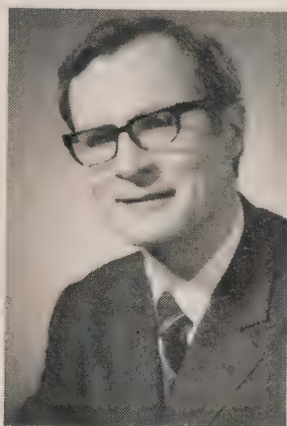
Outbreak of Dutch elm disease has devastated 60 per cent of elm trees in some areas of Britain, including the Thames valley and the Severn Valley.

Once a comparatively minor problem in Britain, the disease has now become an epidemic two years ago. It is caused by a fungus spread by elm bark beetles which have ravaged thousands of more susceptible elms in Canada and the United States. Some success has been achieved in controlling the disease in North America by spraying healthy specimens with DDT and removing infected trees. In Britain, systemic fungicides are being used and there's hope that a blight-resistant species of elm under development in Holland may become a fast-growing replacement. "These measures prove unsuccessful in combating the spread of the disease," says the British magazine *Nature*, "it seems certain within a few years the elm in Britain may be but a verdant memory."

Marketing changes



Ramsay



H. K. Wright

Mr. Ramsay, Ontario Hydro's director of sales for five years, has been appointed to the newly-created position of administrative director — marketing. In his new position, Mr. Ramsay will conduct in-depth studies of the current energy market to plan effective Hydro marketing activities.

Mr. Wright succeeds Mr. Ramsay as director of sales. Mr. Wright has been acting director for three months and for the past year has been manager of commercial and industrial sales. W. R. Wright becomes manager of the newly-created commercial, farm and industrial sales department.

Stand down



Boyer

Ontario Hydro's First Vice-Chairman R. J. Boyer (PC, Muskoka) has announced he will not seek re-election in the next provincial election.

Mr. Boyer, who has represented Muskoka in the Legislature for 16 years, was appointed Ontario Hydro's second vice-chairman in 1962. He served in that capacity until 1969 when he was named first vice-chairman.

Mr. Boyer will continue to serve as Muskoka's MPP until the next general election.

In his letter of resignation to his riding association, Mr. Boyer said: "It is only fair to the party to make it known that I have decided not to let my name stand for re-nomination."

"This decision is taken with regret. There are several projects of value to Muskoka which I have wished to see carried through, although I suppose a time would never be reached when this would not be the case."

"To explain my decision, however, it must be remembered that my term as provincial member of Muskoka has covered a period of 16 years. Only one Muskoka member has served a longer time, a total of 18 years. In this respect I have no desire to establish a new record."

Film wins award

For the second time in six months, a Hydro film has won an award in international competition.

"A Challenge for Tomorrow," Hydro's entry in the U.S. Industrial Film Festival, has been awarded a certificate of creative excellence in the in-plant production category. The Chicago festival attracted 450 entries from Australia, Germany, Holland, Britain, Canada and the U.S. The 18-minute film shows the minute-by-minute demands of people and industry for electric power.

Last December, "It's Been a Good Day," Hydro's film on public electrical safety, won an award of merit plaque from the U.S. National Committee on Films for Safety.

Value for money

About 80 representatives of the financial community saw what investors were getting for their money on a recent tour of Pickering nuclear power station, east of Toronto. Pickering's first 540,000-kilowatt generating unit had been brought on line a few weeks earlier and was undergoing commissioning tests near its rated capacity during the visit. The tour was part of a continuing program to keep the investment community informed of Ontario Hydro's activities.



On tour

From the left are Latham C. Burns, president, Burns Bros. and Denton, Ltd.; Ontario Hydro Chairman George Gathercole; David A. Lewis, regional general manager, Canadian Imperial Bank of Commerce; D. S. Anderson, senior vice-president, Royal Bank of Canada; James R. Crysdale, president, Mills, Spence and Co. Ltd.

He spoke his mind

Harvey O. Hawke, an outspoken advocate of public power who served 40 years on Galt PUC as chairman and a commissioner, died last month in Waterloo Memorial Hospital. He was 91.

Mr. Hawke, a past president of District 6, OMEA, received a certificate of merit in 1962 from former Ontario Hydro Chairman W. Ross Strike for his long service to the Hydro enterprise.

Mr. Hawke was one of the originators of a public liability and property damage insurance system for municipal utilities and the pioneering municipal pension and insurance plan. In 1958, the OMEA honored Mr. Hawke by appointing him an honorary vice-president.

Although Mr. Hawke was best known for his service to Hydro, he served terms on Galt Council and board of education in earlier years. He was an insurance agent for Mutual Life Insurance Company for more than half a century. He retired from Galt PUC in 1961.

Mr. Hawke is survived by his wife, the former Marjorie Mason McLellan, and a nephew, Dr. William Hawke, of Toronto. □

Easier on the pocket

Most of Ontario Hydro's rural customers will have the option to pay bills either monthly or quarterly under a new system approved by the Commission.

Meters will be read quarterly under the system, which will be gradually introduced over the next two years. Reading of meters monthly or every two months, now the practice in many rural areas, will be phased out.

The monthly payment option, tested and evaluated in eight rural areas in various parts of the province since 1969, has been well received by the majority of customers. Monthly payments will be based on the monthly average of the customer's bill for the previous year.

The objectives of this plan are to provide convenience for rural customers in making payments, to smooth out seasonal variations in the amount of each bill and to do this as economically as possible. □

Fisheries study

A \$200,000 fisheries survey will be undertaken in the Nanticoke area of Lake Erie as part of a complete biological program being conducted on the lake.

Ontario Hydro, the Steel Company of Canada and Texaco Canada Limited have announced support for the survey, which will be carried out by the Ontario Department of Lands and Forests. It involves checking sport and commercial fish species, including spawning and food cycles, over the next three years.

The work will assist in establishing existing biological conditions in the part of Long Point Bay which may be affected by Hydro's Nanticoke generating station and the planned facilities of Stelco and Texaco.

Studies of the lake have been going on since 1967, and will continue until the mid-1970's. They will cost an estimated \$800,000. □

Now it's 22.

Twenty-two municipalities are now availing themselves of the computerized billing service offered by London PUC. Under the system, each utility does its own meter reading and sends the information on IBM cards to London for processing. The computer supplies the customer's bill with his name, address, due date and account number, gross and net amounts and various other information ranging from electricity and water readings to sewage charges and taxes.

The utilities involved are: Ingersoll, Alvinston, Bothwell, Port Stanley, Clinton, Strathroy, Aylmer, Ridgetown, Rodney, Drumbo, Penetanguishene, Glencoe, Sandwich West, Essex, Cottam, Baden, Tecumseh, Kingsville, St. Clair Beach, Port Credit, Lynden and Wingham.

Don Grace, manager of administrative services at London PUC, says he usually advises prospective customers to contact one of the participating utilities to see the system at first hand. "We can still expand the system to handle a further 50 utilities," he adds. □

Trouble-shooter

Ontario Hydro's Research Division has developed a unique monitoring and trouble-shooting device for the 4,000,000-

kilowatt Nanticoke generating station.

The device, called an operations sequence analyzer, uses mini-computers. One will record thousands of electrical changes which can happen throughout the station and pass on its findings to the second computer for storage.

The installation can keep track of a situation involving 50 different events occurring in one second, yet still present an intelligible summary. The information is displayed visually on a TV screen. By pressing a button on a control panel, a station operator can get the relevant information from the computer memory bank.

Station operators will need a minimum of training to take advantage of the new equipment in locating faults and in taking corrective action at the generating station.

"It is probably a world's first," says Graham Keyser, superintendent of the section which developed the equipment, "although other people are working on similar developments."

municipal briefs

Toronto Hydro's former general manager, Herbert J. MacTavish has died at the age of 79. Mr. MacTavish retired in 1958. Born in Toronto, he was a 1910 engineering graduate of the University of Toronto. During the First World War, Mr. MacTavish served overseas with the Canadian army and was awarded the Military Cross and the Medal of the British Empire.

From now on, Welland Hydro will be processing customers' bills on its newly-acquired Univac 9200 computer, although manager Reg Turton foresees numerous other applications including inventory control, street light replacement programs, heat loss calculations and perhaps some work for the city's water department. Previously, bills for the utility's 12,300 customers were processed at a commercial computer centre in St. Catharines.

Brantford PUC's electrical department expects capital expenditures this year of about \$750,000, says general manager Norman Grandfield. About \$270,000 of this will be for new buildings including a new service centre.

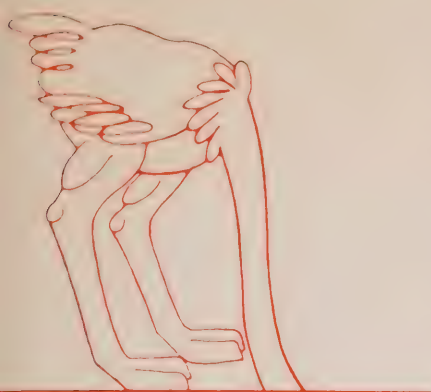
Douglas E. Manlow, former secretary-treasurer of Trenton Hydro, has been appointed manager of the utility. He succeeds John Page, who retired at the end of last year. Mr. Manlow was a manager for a month before his appointment.

New Hamburg PUC has named Arthur R. Roth as its manager. Mr. Roth has been with the utility 13 years and was a foreman until his promotion. He succeeds the late Arthur H. Roth, who died six months ago shortly after retirement. They were not related.

Ontario Hydro's Eastern Region has a new municipal accounts manager. G. J. Morrison, a member of the management services department at Head Office, has been named to the position.

Deep River Hydro received a pat on the back in a recent edition of the North Renfrew Times for its contribution to the unemployment situation. A student is currently delivering 100 bills to the utility's 1,800 customers and, at the same time, dropping off a reminder from the town's works department. Spring clean-up time has arrived. Hydro manager R. E. Smith says a billing costs the utility \$108, while a student can deliver accounts in three days or less at a considerable saving.

Chief cashier Viola Duffield has retired from Thunder Bay Hydro after a career that began in 1930 with the City of Fort William which handled the Hydro bills at that time. W. G. Duffield, manager and secretary of the Thunder Bay utility, presented Miss Duffield with luggage and a piece of jewellery at a luncheon in her honor.



Don wright sees it

ce upon a time, it was thought that the
d things tucked under the global rug
uld last forever. As it had taken millions
years for the chemistry of nature to fill
subterranean cupboards with oil and
and coal and uranium, the supposition
med to be that it would take us about
long to empty them.

We have apparently grossly underesti-
ed the appetite of the industrial society
our ability to procreate. At any rate
shelf lining is beginning to show
ugh in some places and the search is
for alternate sources of energy. One of
directions in which they are looking is
wn — way down.

Geothermal energy is the stuff of which
speak and half-a-dozen countries
e tapped the steam from hot springs
this kind of power. Among the leaders
Italy, where a geyser field now yields
ut 400,000 kilowatts of electricity
n more on the way.

he big bug in the geothermal ointment
at nature has been none too generous
ne distribution of these fissures which
w off steam from the source of the heat
olten rock. Ways are now being ex-
ed to turn turbines with hot water
n these springs instead of the pure
m. It's claimed this will open up many
s to geothermal energy now consid-
marginal.

ow anybody who didn't know there
heat down below, and plenty of it,
never been to Sunday school or read
e's Divine Comedy. But even the
ct imaginative apostle of fire and brim-
e may have underestimated the true
a of affairs.

Scientists figure that the heat in the
r six miles of crust beneath the United
s equals the power of 900,000,000,-
000 tons of coal. They reckon, too,
a the heat will last for some time to
e seeing as how, in billions of years,
earth has only cooled to an average

depth of 30 miles.

Hydro, of course, is fully aware of the
potential and, according to a top secret
Property Division file — which has come
into our possession through a connection
with the New York Times — is already
taking action.

At this very moment, somewhere in the
wilds of Northern Ontario, a 12-inch pipe
is being driven inch by inch into the
bowels of the earth. Skinny property
agents have been recruited and the plan
is to tog them out in red asbestos suits
complete with horns and forked tails. If
they can win the confidence of the folks
at the other end of the pipe, negotiations
will start this month and by the end of the
year they hope to have billions of BTUs
tied up in iron-bound contracts.

Confronted by one of our special opera-
tives, the man in charge of the project,
Jethro Topsoil, could not deny the plan's
existence but pleaded for secrecy. "Some
of our boys are none too healthy," he
pointed out with some logic, "and they
talk a lot. If one should go to his eternal
reward before we have the old fellow's
signature on a contract, he could blow
the whole thing."

Jethro apparently takes for granted the
direction his men go when shuffling off
this immortal coil. But they do deserve a
lot of credit for undertaking a job of this
scope and peril.

As Jethro puts it: "It's a devil of a job
and if we're not careful, all hell could
break loose."

This is, of course, a routine undertaking
for the people who acquire the property
for our generating stations, transmission
lines and what have you. It may be
possible to say a few words in subsequent
issues about their more unusual assign-
ments.

■ Evidence against cigarette smoking and
the dangers of pollution in general con-
tinue to mount. According to one eminent
U.S. researcher, individuals who smoke
more than 20 cigarettes a day or live in
heavily industrialized urban areas have
considerably more difficulty producing
alpha waves. Those they do produce have
extremely low amplitudes.

Not too worried about your alpha wave
amplitude? Better think about it. These
little ripples are said to be directly associ-
ated with mental and physical perform-
ance and their absence reduces both.

If things get any worse, this man sug-
gests, it may soon become necessary to
move our more intelligent people out into
the country. Some will contend they are
already there. Certainly, the next genera-
tion will have to think twice before
sneering at a country bumpkin.

■ It's been an uphill battle and we're
most appreciative of any scrap of evidence
which supports the contention that we
"mature" types are management's best
bet over the long haul. We have a pro-
fessor of medicine at the University of
Oregon to thank for the latest assistance.

He reports that men up to the age of 35
have a sexual thought an average of every
10 minutes; from ages 35 to 50, every 25
minutes; and from 50 on, once an hour.
Surely it follows, then, that the more
senior corporate citizens are the more
valuable. We're thinking of kilowatt-hours
and management by objectives while the
young whipper-snappers are wasting their
time with visions of maidens dancing
through the meadows.

The professor notes that sex thoughts
are an automatic, unconscious, repetitive
activity which are constantly being aborted
by the brain. Otherwise, one gets the im-
pression that man would make a tomcat
look like a saint, which is really the point
he's trying to make. According to his
theory, man is the only animal who can't
forget the whole business — at least for
a while.

■ According to the latest reports from
business journals, the four-day work week
is beginning to make headway. About 90
small and medium-sized companies in the
U.S. have gone to the four-day week and
at least one Canadian firm is experiment-
ing with a three-day week. Employees
make up most of the time by working
longer shifts.

The shorter work week is said to be one
cure for absenteeism, which is reported to
be a growing problem with both em-
ployees and members of management
likely to be among the missing on Mon-
days and Fridays. But how long will the
new therapy be effective? People working
from Tuesday to Thursday are soon likely
to regard Wednesday as the only legiti-
mate day of toil.

Whether or not the four-day week will
ever come to Hydro, we wouldn't know
but if it does we have a good idea when it
will arrive. That will be approximately
two-and-a-half minutes after our own
personal retirement comes into effect. □

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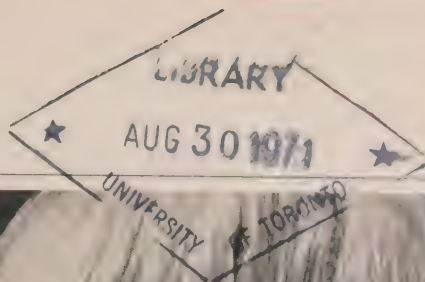
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ontario hydro news

july-august 1971



homestead holidays



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the cover

The farm's a great place for a vacation, especially for city kids, and Sandra Settatre finds this hours-old gosling particularly fascinating. A readily available supply of low-cost electricity has revolutionized farm life over the past half-century and enabled some farm families to cash in on the leisure industry, opening their doors to holidaymakers (see page 13).

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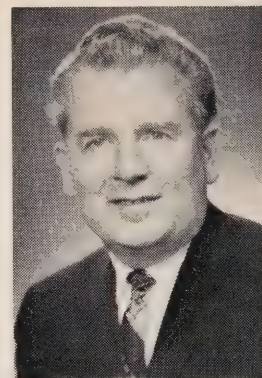
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Commission changeover



Robert J. Boyer



D. Arthur Evans

After nearly nine years as an Ontario Hydro commissioner, Robert J. Boyer, MPP for Muskoka, has returned to private life. His position as Hydro's first vice-chairman has been filled by 56-year-old D. Arthur Evans, MPP for Simcoe Centre.

Mr. Boyer's retirement from the Commission follows a previously announced decision not to seek re-election when the province next goes to the polls. He was first appointed as the legislature's representative on Hydro in 1962, succeeding the now Prime Minister William Davis who left the Commission to become Minister of Education. Mr. Boyer became Hydro's first vice-chairman in 1969.

During his term of office, Mr. Boyer has acted as official liaison between Hydro and the government, keeping Queen's Park posted on the Commission's operations and intentions. He has served as a commissioner during a period in which the province's nuclear power program has been developed and vigorously pursued. Yet he has never let the magnitude of his responsibilities overwhelm his empathy for the needs of the smaller communities.

As a member of the legislature for 16 years, Mr. Boyer has served on all major standing committees and was a member of the select committees on manpower training and the cost of drugs. In 1960, he was chairman of the committee on portable pensions.

Now it's back to the newspaper business to run the family-owned Bracebridge Herald-Gazette. "But I intend to keep an active interest in politics, especially in my own district of Muskoka," he says. "And, of course, I'll always be interested in Hydro and will be following very closely the vast expansion over the next few years required by increasing demands for electric power."

D. Arthur Evans, who takes over the position of first vice-chairman, is no stranger to the electrical utility scene in Ontario. He served as director of District 2 (Georgian Bay) of the Ontario Municipal Electrics Association for three years and as a member of Bradford PUC for 14

Mr. Evans was reeve of Bradford between 1954 and 1960, when he was elected its first mayor on it becoming a town. He had to vacate the office a few months later when he won the by-election for Simcoe Centre. As a member of the provincial legislature, Mr. Evans has served as chairman of the standing committees on labor, municipal and legal bills, government commissions and estimates. He was also a member of the select committees on the municipal act and related conservation authorities and rules and procedures. Mr. Evans was warden of Simcoe County in 1958.

"This is a great challenge to me," he says of his appointment. "Although I have a good number of years' experience in Hydro, this is a much bigger job." □

let's talk it over



Ontario Hydro is holding literally hundreds of meetings with planning boards, government agencies and local communities to work out the best routes for transmission lines and the most convenient power station sites.

NTED: property covering approximately 42,000 acres, varying in width between 600 and 700 feet. Prefer reasonably flat terrain free of obstructions such as trees, rocks and waterways. Some large front lots may be required. Buyer is required to lease back portions to existing owners. Minimum of disruption guaranteed.

Ontario Hydro were to advertise its real requirements, the copy might read something like this. Such an approach is silly, although Hydro is doing the next thing. It is holding hundreds of meetings with local planning boards, government agencies and members of the public to work out the best routes for transmission lines and locations for power stations.

the need to acquire 42,000 acres (only 600 square miles) in the next years, the job is a phenomenal one.

Nastich, Hydro's young and aggressive director of property, is a busy man.

His daily diary reads more like that of a touring diplomat. One morning recently, he and Ron Miller, manager of property analysis, flew to a Western Ontario community to discuss a proposed right-of-way with a local landowner and a planning board. He was back in his office that afternoon for a meeting with government representatives on another controversial issue. One day he accompanied several deputy ministers on an aerial tour of a right-of-way project to give them a first-hand look at the proposals.

Land acquisition has always been a difficult job, particularly for a public utility. Ontario Hydro averages more than 6,000 transactions a year, and each of them requires individual attention. They range from outright purchases to the negotiation of easements or rental agreements for the right to utilize portions of property.

Every effort is made to negotiate amicable agreements rather than resorting to expro-

priation. Over the years, the expropriation rate has been surprisingly low. Out of 43,540 property transactions in the past seven years, only 303 or less than 1 per cent have been decided by the courts.

The biggest single property purchase in which Hydro was involved was the acquisition of 33,000 acres for the Robert H. Saunders-St. Lawrence power project. More than 6,500 people were affected as seven communities and part of an eighth went under water. Three new towns were created to replace them.

Last year, Hydro purchased 7,400 acres for \$11,600,000. Only 384 property owners were involved. Easements were negotiated with several thousand others for an additional \$700,000.

With a land acquisition program like this, it's not hard to picture the stumbling blocks that can occur. Problems may vary from an objection by a property owner over the location of a transmission line near



his home to a complicated environmental problem involving a whole community.

Hydro has 21 agents on the road. Each travels 25,000 miles or more a year. They are often away from home two or three weeks at a time. No one can assess the public's attitudes better than the men on the job and most agents agree that attitudes have changed. People are increasingly concerned with the environment.

"We're in a whole new ball game and playing with different rules," says Mr. Miller.

A new approach to property acquisition was launched last September when officials of 20 community planning boards and townships in the Kingston area were invited to discussions on transmission line requirements.

The meeting represented completely new thinking by Hydro, which previously tried to keep its plans out of the public arena until they were well advanced. Meetings with planning boards were nothing new, but this particular session brought several together at one time to seek their advice and assistance before plans were finalized.

Among Hydro officials at the talks were representatives from property division, public relations and transmission and distribution projects division. They laid out maps and colored plastic overlays

pinpointing conservation areas, hills, streams and populated districts. Engineers then outlined the alternative routes for a 500,000-volt transmission line from the new Lennox generating station. It was explained that while the line wouldn't be required for several years, the route must be settled so that property acquisition and construction can proceed in time to meet the target date.

Response to the meeting was favorable. Further talks were held the following month with the individual townships. Local news media were also told of the general proposals.

With its open approach, Hydro had tipped off property owners before any attempts were made to buy their land. However, all concerned agreed that benefits of such a policy more than outweighed any possible risks.

They were right. Within a few months, Hydro had received community approvals and with very little opposition. Involved would be two lines, one running 19 miles northeast from Lennox and the other 12 miles northwest. About 2,700 acres will be obtained from 150 property owners.

The actual purchases may take some time, but the work should be easier since the route has been accepted by the townships through which it must pass.

Essentially, the new approach involves

selecting a preferred route and several alternatives, then opening discussion planning boards and regional authorities co-ordinate plans to best fit the total picture. It was also used in connection with options for a power station site at Bowmanville and the accompanying rights-of-way. In a matter of months, Commission had options on 700 acres with virtually no opposition.

Naturally, stations of the proportion being built will require large-capacity transmission lines. But Hydro is doing everything possible to minimize the inconvenience. The use of rights-of-way for other purposes than the transmission power is likely to become more pronounced. Farmers are being told to lease back the land for continued cultivation, less only the space occupied by transmission towers themselves.

Various committees of Hydro, such as amenities committee headed by Pat Campbell, assistant chief engineer—design and construction, are exploring feasibility of opening rights-of-way to public for recreational purposes and other uses. One recent project, for instance, involves the use of part of a right-of-way as a football field.

To help solve some of these problems, property division has established a special property planning department headed

ay lines and golf courses are two uses being made of Hydro
of-way. Below, whole communities were relocated for massive
wrence power project. At right, children play near sign which
tes a protest by hippies over the planned demolition of 20 derelict
s in Toronto to make way for a transformer station. While another
tion of the hazards of property requisition, the confrontation
nique in the history of Hydro.





Ron Miller, manager of the property analysis department, and Don Washburn, supervising draftsman, examine plastic map overlays to assist Hydro's property men to select the best possible routes for power lines and then their selection to the public.

John Dobson, a former load forecasting engineer. Mr. Dobson meets regularly with individuals, politicians, government officials and others to discuss topics related to long-term property needs. He represents the director of property on task forces dealing with the use of rights-of-way both by other utilities and for parks purposes or even for commercial enterprise.

In future, Hydro land might be utilized for virtually anything, be it for pasture or mushroom farms, pacing tracks for race horses or zoos, nurseries, parking lots, drag racing, golf, urban transit systems, pipelines or even gravel pits.

Mr. Dobson is Hydro's representative on two government liaison committees which review the plans of all government departments and agencies with regard to their effect on regional development.

The importance of co-operation with such groups is best illustrated by the problems that have arisen in connection with the blueprint for development in the Toronto-centred region. Prepared by the provincial government and released last year, this plan was announced after Hydro had surveyed and selected a route for an extra high voltage line stretching from Lake Erie to Lake Ontario between the Nanticoke and Pickering power plants.

The government plan outlined transmission

and transportation corridors utilizing parkway belts in the southern part of the area. Hydro's plan called for a corridor further north. As a result, extensive and co-operative studies were needed to arrive at a satisfactory solution.

Mr. Nastich feels that with the new approach, in which Hydro takes the initiative with planning boards and government departments well in advance, such delays can be avoided.

The acquisition of property is also being made easier by the efforts of Hydro's research and engineering groups to keep in the forefront of technological developments. For instance, the possibility of placing short stretches of high-voltage line underground is under active consideration. A few years ago it was considered a pipe dream. To some extent, this is still the case because costs are about \$1.5 million a mile, roughly 10 to 15 times that of overhead.

Among the main problems of underground high-voltage transmission are insulation and cooling. Oil and gas under pressure are at present used as insulators, but Hydro research teams are experimenting with various money-saving techniques, including wires insulated with high-quality polyethylene. Because of the enormous technical problems and costs involved,

future application of underground techniques will first be extended to urban and highly valuable suburban areas.

Underground transmission in rural areas is not likely for some time. However, considerable progress is being made toward more attractive profiles for transmission towers. J. G. Cassan, in charge of Hydro's transmission line research, says the mission may soon be building towers "will be really fantastic." At Hydro's invitation, consulting firms recently submitted proposals for towers which striking departure in design.

In addition, new methods are speeding the design and planning of hundreds of miles of lines now being built.

No longer do surveyors have to wait a farmer's property to map out a future. Helicopters, equipped with stereoscopic cameras and other equipment, do the work in short order. From these photographs, topographical maps are easily constructed with graphic overlays depicting gravel belts, water, hills, valleys, trees, rock and population areas.

All this effort by the engineering and research divisions helps property owners to acquire and develop the most cost-effective and acceptable routes for transmitting electricity across Ontario. □

COCHRANE EXPLODED IN FLAMES

Three thousand persons were left homeless in Cochrane alone when fire swept through pioneer communities in Northern Ontario just sixty years ago.

By Harold A. Wills

In many headlines, these words are a understatement.

What actually happened on July 11, 1911, was that several Northern Ontario communities, miles apart, disappeared in the devouring flames at practically the same time.

At the time, the scene had been in the making for weeks. It had been getting hotter and hotter, and there was no rain. The editor of The Northland, Cochrane's only newspaper, which had just passed its first anniversary of its founding, had ahead the production of his July issue, he at least had the opportunity to show his brows in type.

On the page, he exclaimed in a filler: "It is said to be the frozen north here. Can The Northland get a little ice?" On another page: "Sunday, it was said to be 102 in the shade." (That editor was in the Porcupine Camp, 40 miles to the southwest, the thermometer read 106.)

The homesteader who had followed the trail of the Temiskaming and Northern Ontario Railway (now the Ontario North-West Railway) into the wilderness during the previous three years, the heat was a blessing in one. Clearing land and the heat was dreadful, but the windrows of brush and stumps dried quickly and consumed like fireworks.

Cochrane was ringed by settlers' fires, and in the Porcupine area the lure of gold had brought hundreds of prospectors into the wilderness. Each his own law at cookout time. Several hundred square miles of open bush, the motives differed but the motives were the same — men took advantage of the easy-burning conditions, some were careless.

For years Cochrane had experienced dress fires on a lesser scale — small but devastating fires confined to the town. Some of the original homes and stores had been made of wood.



Belongings were thrown into the streets as 3,000 residents of Cochrane fled the 1911 inferno.

Not only was this the most readily available material, but it was the least expensive and most easily transportable in a climate which made winter shelter vital.

More than the shacks testified to the close relationship between community and forest. When a sidewalk was laid it was planked. The cleared lots within as well as without the town were littered with combustible slash and stumps. Where the new roads were anything but a morass of mud, it was only because of corduroy. Fuel stored against the coming winter meant more wood.

All these conditions spurred the sort of protective effort of which a community numbered in the hundreds, with a million things to do, was capable. Three chemical fire engines had been purchased, and by early July they had been placed at strategic points. A volunteer fire brigade had been recruited.

Progress was also being made on a generating station beside one of the small lakes south of the townsite. Everyone

impatiently awaited the time when it would provide them not only with light to replace the candles and coal oil lamps, but with power to pump water which would quell fires as well as quench thirst.

A fire which broke out about 2 a.m. on Sunday, August 12, 1910, had shown what could easily happen. Wakened by the whistle of a yard engine, bank manager C. H. Lloyd had that morning roused his neighbors by firing a number of shots, quite an effective fire alarm, but in three hours 19 business places were destroyed. In two blocks only one house was left standing, and their new sidewalks had burned with the buildings.

The next serious warning came on the afternoon of Friday, July 7, 1911, after The Northland for that week had been printed. A blaze started in the Cedric Hotel, wiped out that building and its annex, the newspaper plant, stores and every home in the block. The newspaper's two Gordon presses were tumbled out of doors before the flames reached them. But before



they could be returned to service, the whole town had been lost.

TUESDAY, JULY 11 . . . the heat wave was unbroken. There was a strong wind, and the homesteaders' clearing fires were fusing into larger and larger masses of flame. During the morning, huge clouds of smoke rolled toward the town, darkening the sun, but it was "business as usual" for most people. They were too much occupied in building their homes and stores to do more than cast anxious glances at the billowing smoke.

NOON . . . Uneasiness made a poor sauce for dinner, and some men decided to knock off work and stay with their families. Reporting his experiences afterwards, W. J. Bauldry, the townsite inspector, said that greater expanses of cleared land would not have checked the conflagration once it caught hold. With a group of workers he had been facing the burning bush outside the town. "We were astonished on looking back to see that it was burning away behind us."

TWO O'CLOCK . . . Fire swept into the northwest corner of the town. Workers at Boivin's sawmill with its stockpile of lumber fought to save the machinery, then raced for their lives before flames that stopped only when there was nothing more to burn in front of them.

FOUR O'CLOCK . . . The high wind became a roaring gale. It changed direction unpredictably. Efforts to hold the flames in the bush could not check the choking pall of smoke or quiet the roar of the fire. Householders began to pack and every vehicle was pressed into service to move them to what seemed safer places on lake shores and in the railway yard. Then the wind changed again, the buildings seemed to suck in the flames, and in a few critical moments the fire fighters had to down their tools and run.

A Mr. Wright, of the Transcontinental railroad, returned for an elderly neighbor after getting his own family away. He had to carry her, but a building exploded and both were thrown to the ground. He dug into the sand with his hands so they could catch their breath in the hole, and while both received burns, he was able to get the woman to safety.

While such rescues multiplied, there was a rallying of men able to battle the flames licking out toward the vital centres of resistance — the railway buildings. From them, railroad crews operated a train shuttle service to get women and children out of the immediate danger zone, although salvage in the rail yard and several coal cars caught fire in the very heart of the crowded refugee area.

Railway telegrapher George Taylor kept the news moving to the outside world throughout the pandemonium. Twice lines were cut and the instruments were moved to the railway "Y". Again and again the bone-weary defenders saved the railway station and restored the burned lines.

SIX O'CLOCK . . . For Cochrane it was all over, while the barrage of fire moved onward. There were 3,000 homeless refugees, their only shelter two railway stations, the railway offices, half a dozen nearby buildings and a few houses on the east side of Lake Commando. The railway contractors not only fed the hungry but gave additional shelter in cars and on flat cars until the families could be moved south next day, mar to the hospital in New Liskeard, 140 miles to the south, where the rhythm continued in births and treatment of scarred. Amazingly, only two Cochrane people died.

There is another story in the resilient burned community and the response to the outside world. Relief supplies flowed in quickly — rebuilding was under way before the ashes were cold. The brick union station, which had just been completely renovated, served as mess hall, dormitory, church, bank and town hall.

at left shows Cochrane stores as they appeared in 1910. False fronts like these provided fuel for the fire. Top picture shows the town's main street as smoke billowed forth in 1911 fire. weeks that followed, business resumed in hastily improvised premises like the fruit store. Men in bottom photo operated the community's coal-fired generating station.



while the King George Hotel reopened in a tent, and businessmen brought in new stocks. The T. & N.O. line ran through bush still blazing on both sides. So intense was the heat that the first train out had to race with closed windows to protect its passengers. An express car left the track at Sese kinika, and while no one was injured, travellers had to hike through burning bush to reach a rescue train.

Not until Saturday afternoon did heavy showers check many still smouldering fires.

Terrible as was Cochrane's ordeal, the disaster was widespread. South Porcupine, Pottsville, and other communities were snuffed out or scarred. Between July 11 and 19, nine hundred square miles of forest and farm land were devastated, the official known death toll was 73, and in the 20-mile-wide swath knifed by the gale-force winds, property loss was estimated at \$3 million.

Cochrane's utilities, for the most part then only on ballot papers and franchise agreements, may be said to date from the great fire. By a vote of the ratepayers on April 4, 1911, a franchise had been granted to the Cobalt Power Co. Ltd., which was to provide light and power to domestic and commercial users, street lighting, and to pump water through the town's mains which, with a sewerage system, were approved by the ratepayers at the same time.

Within a week of the fire, manager Frank Graff had travelled through the scorched countryside and purchased poles and crossarms to replace those burned. The generating station was pushed to completion and by September was in operation. Fine pea coal was burned to make coal gas, which ran the engines that generated the town's first electricity. By October the water pumps were in use, and street lights were turned on in February, 1912.

When the ratepayers approved the power franchise and water borrowings, they also granted a separate telephone franchise, and a phone system was beginning to take shape when the great fire struck. A month afterwards the heavens, in delayed counterpoint, were reverberating in a series of terrific thunderstorms, with their own accompaniment of gale-force winds.

One night a thunder clap of particular ferocity marked a lightning strike on a phone pole, and next morning chips from the pole were found 50 feet away. In the face of such difficulties system construction faltered, and the franchise was taken over by the power company in November, 1911. It was these post-fire developments which were responsible for the fact that

A permanent Ontario Hydro community of 450 people is maintained at Abitibi Canyon, 60 miles north of Cochrane, to run four hydro-electric stations and the Pinard transformer station as well as a section of extra high voltage transmission line.



Cochrane's telephone system has remained a municipal utility.

At the end of the first 10 years of the franchise period, the town bought all privately-owned utilities, and in January 1921, turned them over to a newly-created Public Utilities Commission, which for 50 years has been responsible for power, water and phones, and since 1943 for the sanitary sewer system as well.

In 1926, Cochrane entered into a contract to buy electricity from the Abitibi Electric Development Co., which had completed a power development at Island Falls on the Abitibi River. The old coal-fired power plant was eventually demolished. Two and a half years later, Ontario Hydro assumed the Abitibi obligations, and since 1926 the town has been a member of the family.

Cochrane has had a longer and closer relationship with Hydro than such a simplified history would suggest. The earliest railway surveys had pointed to the power resources of the great north-flowing rivers, and extension of the T. & N.O. northwards from Cochrane was spurred by the power projects undertaken to meet the demands of the North's paper mills and mines.

First came the privately-financed project at Island Falls, next the Abitibi Canyon plant which was launched by Abitibi Power & Paper Co. subsidiaries. When the depression halted that project, the province took it over and entrusted Hydro with completion and operation.

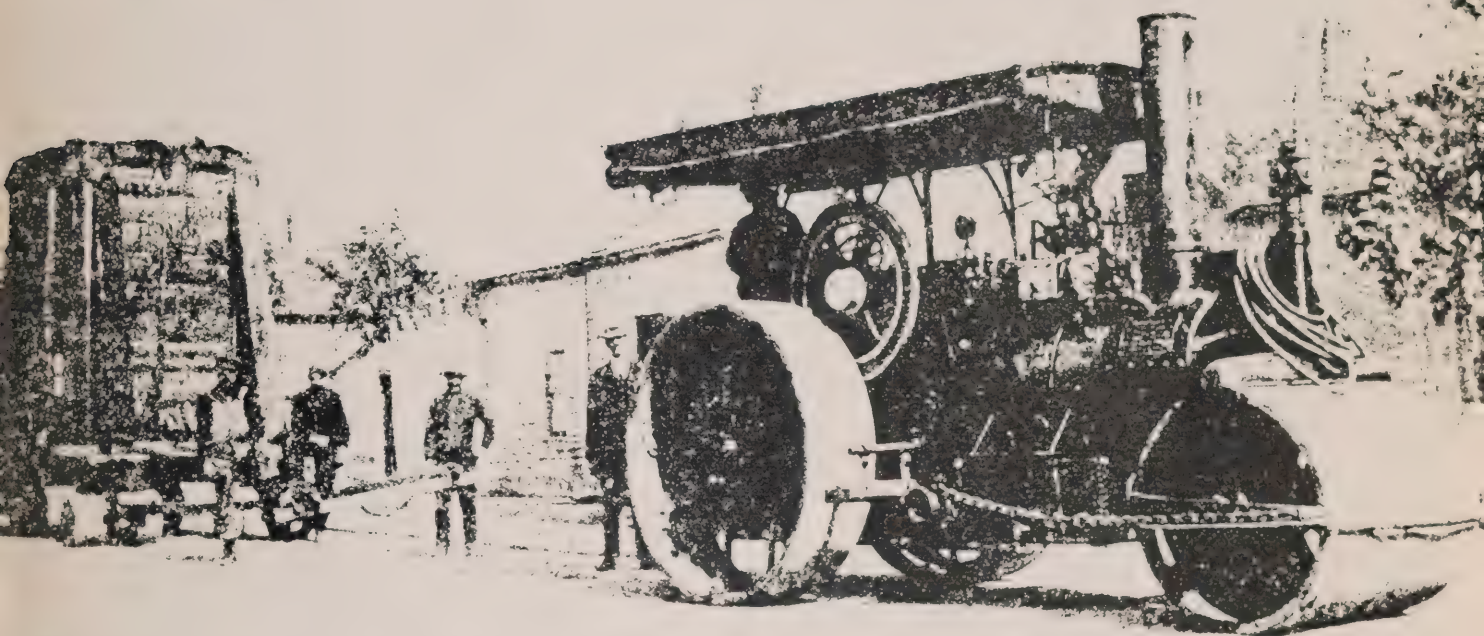
More recently, a 174,800-kilowatt development at Otter Rapids on the Abitibi was teamed with construction of the Long, Harmon and Kipling generating stations on the Mattagami River (combined capacity 376,200 kilowatts). One of the most of these modern plants together with the Pinard transformer station and control centre near the Canyon, transmitting power south at 500,000 volts.

Cochrane's economic growth was stimulated by each of these development turns — by the railway, whose steel mill opened at Moosonee in 1932; then by the successive power construction projects, as men, supplies and machine tools moved through the town's railway junction.

So while the community was born in the early days of the T. & N.O. and the National Transcontinental, now a part of the Canadian National system, it has received a continuing impetus from the successive development of hydro-electric sites

BETWEEN TWO CATACLYSMS

In his second article in this series on the development of public power in Ontario, Bob Morrow deals with the period between the two world wars.



Of transportation methods of the times, this steam roller was pressed into service to move 12-ton transformer in Port Arthur.

Coming of Hydro brought a dramatic
reduction in rates, but attacks on the new
public enterprise continued without letup.

Some predicted Hydro would fall flat on
its face; its champions were called "crack-
brains" and "visionaries." A London news-
paper declared that Adam Beck, Hydro's
chairman, was a monomaniac on the
subject. Some opponents said
that it would bankrupt the province.

The Hydro and anti-Hydro factions were
deeply entrenched. On one side was the embattled
Hydro, staunchly supported by a growing
number of Hydro municipalities whose
ratepayers voted to buy power from Hydro;
the other were private power interests.
The public vs. private power controversy
dominated the newspapers for years.

Beck and his supporters viewed public
power as a socio-economic crusade to
reform the province and fought to
expand Hydro while private power interests
launched a campaign of ridicule and vilifi-

At times, the furor reached an evangelical
pitch. W. J. Lyons, of Guelph, an ardent
supporter of Beck, depicted him as a
modern Moses. "He has taken us out of
Egypt, and we are already crossing the Red
Sea and going to the promised land."

Beck seized every opportunity to con-
found Hydro's critics with facts and
figures and ruthlessly used low rates as a
weapon to drive private companies out of
business. He condemned them for pro-
viding "power services at high cost to the
few who can pay for them, fat dividends
for the shareholders and little, if any,
concern for the electrical needs of the
general public."

By and large, the people backed Hydro
with enthusiasm. The basic philosophy of
power at cost (meaning no profits) meant
real savings to customers. Beck estimated
that in 1919 users of electricity in Galt
saved enough, by reduction of rates, to
pay their taxes.

Few people anticipated the power demands

that resulted and utilities were hard
pressed to provide service.

Toronto Hydro's peak load in 1912 of
12,830 kilowatts nearly doubled by 1914
and, spurred by war industries, jumped to
44,875 kilowatts by 1918. Within a few
months of its formation in 1914, St.
Catharines PUC was installing street lights
and by the end of the year more than 800
homes had electric lights instead of
smoky lamps.

The pattern was repeated in every Hydro
community. The initial supply of low-
cost power created new demands as
people realized that electricity provided
more than a better form of light by which
to read the newspaper.

When merchants balked at selling appli-
ances — some dismissed them as "toys" —
utilities set up Hydro shops to sell them
and to educate the public in their use.
London PUC, for example, sold thousands
of electric irons by distributing them by
horse and wagon to city housewives
for a free trial period

Some merchants refused to sell electrical appliances like these when they first appeared, referring to them as toys. Utilities established Hydro shops to encourage their use.



Cheap power enabled industries to expand, particularly during World War I, and as the electric motor replaced the steam engine many factories ceased to belch smoke and soot over their communities.

To supply growing power demands, 99 out of 100 municipalities overwhelmingly backed construction of the Sir Adam Beck Generating Station No. 1 in a 1917 referendum. The Niagara River project, a staggering undertaking for the young Hydro organization, was the largest hydro-electric plant in the world when placed in service in January, 1922.

A royal commission which investigated project costs, inflated by wartime scarcities, termed the plant "a magnificent piece of engineering." Fifty years later, it's still a reliable power producer.

In 1913, a vigorous campaign was launched by Beck and the Ontario Municipal Electric Association for construction of publicly-owned radials (interurban electric railways) to improve communications and transportation.

The idea gained support because few good roads existed, but was ultimately killed in the early twenties by the growing number of autos. (In retrospect, the radial concept was probably 50 years too soon. Today, city planners are suggesting high-speed electric transit as a solution for traffic jams, urban sprawl and air pollution.)

With an abundant supply of electricity available, power demands continued to increase during the twenties, accompanied by growing employment in manufacturing industries.

Small as well as large centres benefited. An American visitor, Martha B. Bruere, described Woodstock in 1924 "as the perfect flower of Hydro towns." She counted 28 industrial plants, the largest employing about 200 men and women. "Several have been built since the coming of Hydro and more than half have been improved and enlarged," she wrote.

But nowhere was the impact of electricity more dramatic over the years than on

Ontario's scattered farms. To a former Chatham area resident, who recalls "horse and buggy days when farms and lanes were very dark and dreary-looking electricity was a "wonderful thing." In the early days, however, line construction crews occasionally met farmers with shotguns. The farmers little knew that municipal service would eventually provide the backbone of a grid to serve rural population. Many had to be convinced, too, that electricity could do chores cheaply and efficiently.

As early as 1912, Hydro started to promote the use of electricity on farms with demonstrations and a travelling "circuit." Hydro's first rural distribution line was built in 1913 to serve an orphanage and a few farms in the Kitchener area; in other areas, municipal systems were extended to serve nearby farms.

Rural electrification, however, was temporarily capped by World War I shortages (and was to be later on by the depression of the 1930's and World War II) and the



Size of the intake tunnel at the Ontario Power plant, a forerunner to the Beck stations, was effectively demonstrated in 1910 by this party of motorists. At right, paving machine — 1921 vintage — is operated in the diversion canal for the Sir Adam Beck Generating Station No. 1 at Queenston.



omic problem of providing power at
nable cost in sparsely-settled town-

so, by 1919 municipal-type systems
een set up in 27 townships and in
, when the province began to pay
s-in-aid of 50 per cent of the capital
of rural primary lines, rural Hydro
ed momentum.

er this program, electricity undoubtedly
ed earlier on Ontario farms than it did
S. rural areas. Rural customers in-
ed to 44,782 by 1930 and to 111,531
39. The greatest expansion has
red since 1945. Today, about
00 customers, including 128,322
, are served by Hydro. This figure
sents 97 per cent of the rural popula-

icity helped to usher in a quiet
ition in Ontario farming. In 1900, one
orker produced sufficient for him-
id four others. Today, with fewer
and less cultivated acreage, a farmer
ces enough for himself and 41

others. Farm cash income from all sources
exceeds \$1.5 billion annually, representing
one-third of the Canadian total.

About 400 electrical labor-saving devices
are available to farmers, eliminating much
drudgery and enabling them to use new
techniques to produce food and reduce
spoilage.

Between 1951 and 1969, Ontario farmers
more than tripled their use of electricity.
The cost per kilowatt-hour declined 9.6
per cent in this period while the price index
of services and commodities used by
farmers rose 63 per cent.

First radio, then TV, helped break down
rural isolation and appliances made the
farm home as comfortable and pleasant as
a city residence.

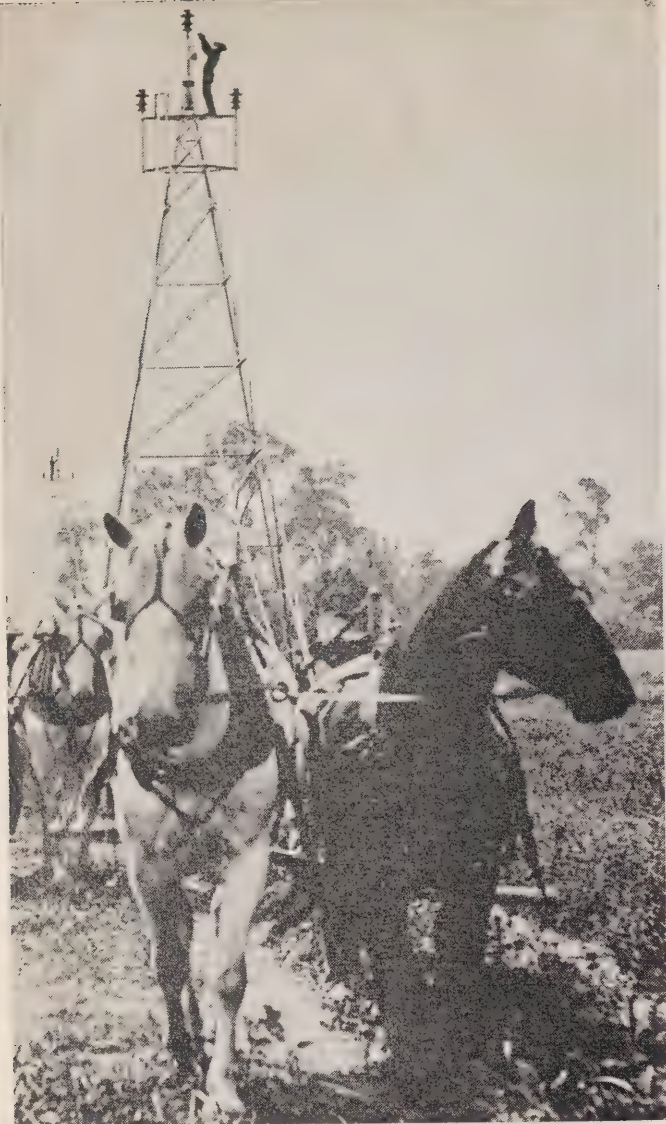
While Hydro service was being introduced
in Southern Ontario, Ontario's northland
was considered merely a vast area of rock,
muskeg and virgin forest. The silver boom
in the Cobalt district between 1903 and
1908 attracted attention, but no one

dreamed that the north was a treasure
house of nickel, copper, iron ore, gold,
platinum, zinc and uranium.

But as railways opened up new areas for
mining operations, low-cost hydro-electric
power played an important role in fostering
mineral production of national and inter-
national importance.

Nickel mining, smelting and refining —
which now accounts for nearly half of
the gross value of all metallic minerals
mined in Ontario and 57 per cent of the
world's production — began to assume
major significance when Hydro power
from Abitibi Canyon was made available
in 1933.

Delivery of Nipigon power in 1920 spurred
the Lakehead grain industry and en-
couraged pulp and paper manufacturing.
Since then, Hydro has built up a network
of new and acquired stations to keep a
step ahead of northern development.
Many of the north's primary industries
are directly served by Ontario Hydro. Last



Horses were used in the early days to string transmission lines. At top, an electrically-powered car of the Toronto and York radial railway on Yonge Street. Below, the Sir Adam Beck "circus" demonstrates an electric saw to farmers.



year they included: pulp and paper, 19; gold, 3; copper and nickel, 9; iron, 7; and uranium, 2.

These 40 customers, along with 48 other directly-served customers, used 20 per cent of the 68 billion kilowatt-hours of electric energy supplied by the Commission in 1970 — a reliable yardstick of Ontario's economic development.

Upon completion of the Niagara project, Hydro met steadily increasing power demands mainly by purchasing surplus power from Quebec and by acquiring private power plants and, where necessary, increasing their capacities.

Despite the depression, demands climbed in all but three years. The municipal systems steadily expanded to meet the needs of increasing numbers of customers. Rates were steadily reduced and average residential consumption climbed as homeowners acquired more appliances, including electric stoves, refrigerators and radios.

In 1939, Canada girded for an unprecedented war effort and Hydro stood ready to respond to the increasing demands for power of expanding industries. "Hydro must and will prepare to meet the demands that may be made upon it for the furtherance of this war," said chairman Dr. Thomas H. Hogg in an address to the OMEA in 1940.

Dr. Hogg summed up Canada's progress since 1914 in becoming the fifth largest trading nation in the world. He noted that 175,000 autos were produced in 1939 compared with 25,000 in 1914, mineral production had risen from \$144 million to \$444 million and exports had climbed from \$400 million to \$927 million.

Ontario's role in Canada's development since 1914, and during World War II, was undoubtedly due in part to the unique partnership between Hydro and the municipalities. It would be difficult to measure how much, but Canada's rise to nationhood parallels Hydro's growth.

In 1945, Hydro distributed 2,608,000 horsepower compared with 77,000 in 1914. The capital investment of Hydro the assets of municipal systems rose this period from \$25 million to more than \$521 million.

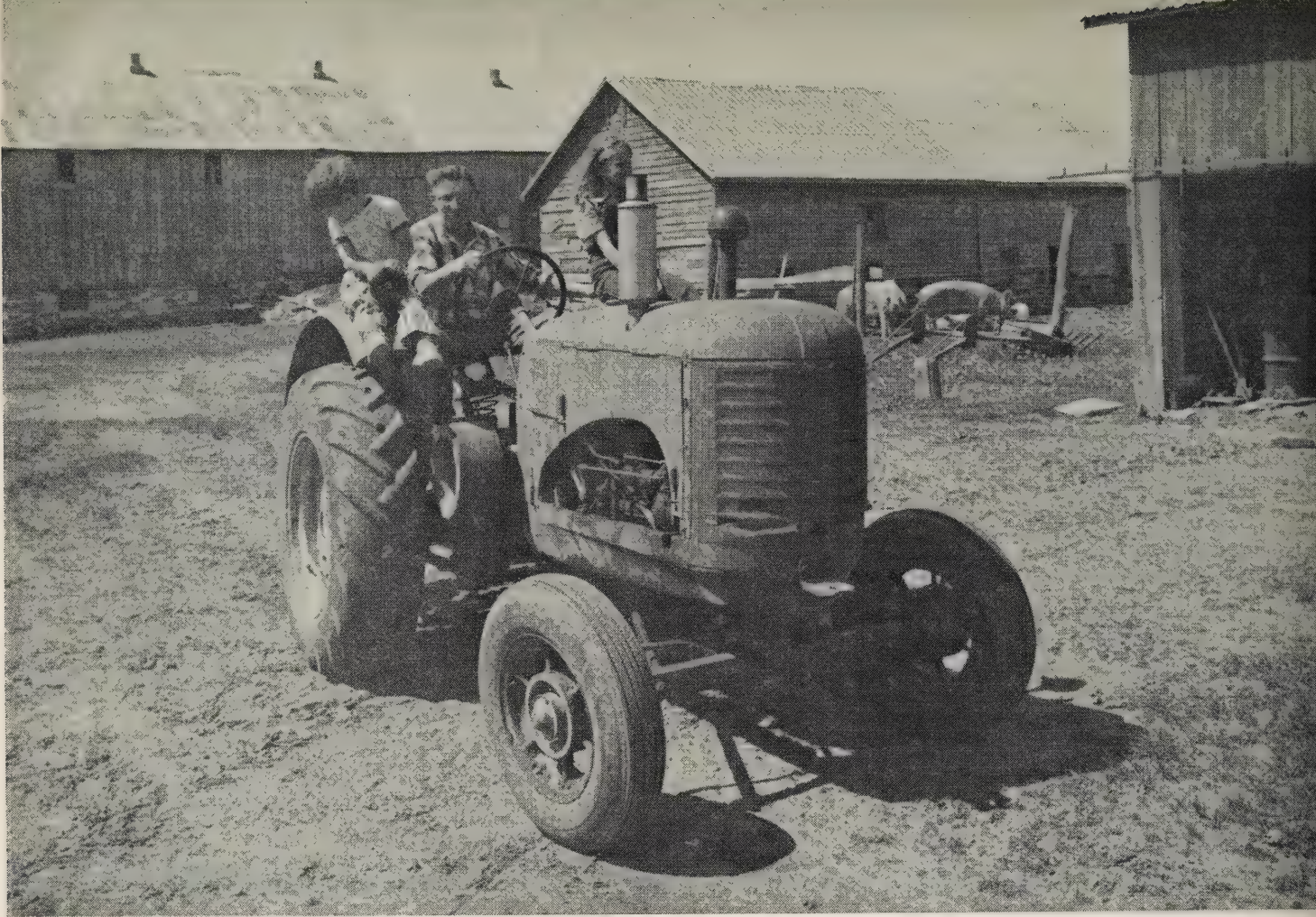
Meanwhile, the ratio of net debt to assets in local distribution systems had been reduced to 7 per cent and revenues climbed from \$3.4 million to \$44.4 million.

When the war ended in 1945, few people foresaw the tremendous post-war growth that would occur, requiring Hydro to embark on its greatest period of expansion. Indeed, some experts forecast a depression.

But not Dr. Hogg. In that 1940 speech he predicted that an influx of post-war industry would offset any shrinkage in wartime power demands. In fact, Ontario experienced a power shortage. □



Homestead Holidays



Labor-saving appliances and the increased use of electricity in agricultural operations have enabled many small farms to open their doors to holidaymakers. Writer Bill Settatee and his family discovered what a vacation is really like down on the farm.

The quiet country town of Sydenham had settled down after a busy day and was virtually deserted except for two motor-bikes and a speeding half-ton truck. A lone fisherman cast his line into the mirror-like lake on the edge of town while nearby a farmer walked leisurely behind the dairy herd he was rounding up to milk.

A few miles away, down a winding road, a 19th century stone farmhouse, nestled among a grove of maples on the edge of a spacious lawn, attracted the attention of passing motorists. The barns, built in the same era, reflected their age, but inside were all the modern conveniences of a small dairy farm.

The barn doors swung in the gentle breeze almost as if they were waiting for the master to return with the cows. A few chickens and geese wandered aimlessly around the barnyard. Occasionally, the grunts of pigs could be heard as they waited

impatiently for their evening meal. The now unused silo leaned precariously and Pisa-like.

This is the setting for a brief escape from the hustle and bustle of urban life. There is no smog, no fumes, no traffic and no noise; just peace and quiet — 100 acres of it — and plenty of room for children to roam, a perfect example of the growing interest in Ontario farm vacations.

The scene was the Preslar farm, better known as Maple Lawn. Harold and Lilian Preslar have been hosting visitors to their home for eight years. Their ninth season will likely be the busiest yet.

"We're kept busy from June through September and we love every minute of it," Mrs. Preslar says. "We like meeting people and when they're here they almost become part of the family."

Visitors eat with the family and sleep in the farmhouse. They enjoy all the privileges

of home. They can do as they wish and are under no restrictions. Contrary to popular belief, a farm vacation is not working holiday where the crowing of a rooster at 5.30 a.m. means the visitor up to milk the cows. Occasionally, guests on the Preslar farm do get into the spirit of farming, but it's at their own initiative. One visitor, a New York stockbroker, went out and bought his own overalls so he could feed the pigs their evening meal.

There's a certain bit of magic in that stone barn and its hayloft that attracts children. Mr. Preslar says that some visitors spend hours rolling and romping in the

The farm is typical of bygone days, but it is fairly modern, too. Outside, the Preslar have kept the old homestead appealing deliberately. It has a certain appeal and many an artist has put it on canvas.

With 11 cows, a few pigs, some geese and hens, the farm keeps them occupied



Preslar also finds time to drive a school
 While a certain amount of income is
 ved from visitors, they don't count on it.

open our farm because we love
 pany," Lilian Preslar says.

Electricity has helped them and other
 ario farmers to move into the farm
 tion field. Without modern con-
 ences such as electric stoves, lights,
 zers, dishwashers and pressurized
 ts, together with the coolers, milkers
 other farm equipment, today's farmer
 ld have neither the time to entertain
 its nor the type of accommodation
 would appreciate.

Electrification is almost province-
 with an estimated 95 per cent of
 ario farms electrified. Some of the
 alled "factory" farms use as much
 rcity in a year as a good-sized manu-
 ring industry.

Other forms of mechanization have helped
 Ontario to gain a reputation as one of
 the most sophisticated and highly
 mechanized farming areas in the world. Of
 the 110,000 farms in the province, 70,000
 are classed as commercial operations.

Mechanization has contributed to a
 marked increase in farm output. Where 35
 years ago a farmer in Ontario produced
 enough food for himself and 11 others,
 today he is producing enough for 41
 others. And while the output from the
 Preslars' cows and pigs may be small, in
 relative terms, their farm does feed 40 to
 50 families during the tourist season.

The smell of home-baked bread and fresh
 rhubarb pie usually attracts hungry visi-
 tors to the spacious Preslar kitchen.
 There's an ever-ready supply of hot coffee
 and Mrs. Preslar goes about her work
 while chatting with visitors who might
 relax at the big kitchen table or be seated

in the two old-fashioned rocking chairs in
 the corner.

A gleaming white electric range and a
 modern dishwasher are in sharp contrast to
 the old coal-and-wood stove on the other
 side of the kitchen which reminds visitors
 of how it was done "back then."

Dinner is served in a large dining room
 whose antique furnishings are a story in
 themselves. The living room, with its
 scalloped ceiling, is well appointed. A
 player piano in the corner is enjoyed by
 many visitors. A separate library provides
 ample reading material.

Lawyers, stockbrokers and even the wife
 of India's finance minister have visited the
 Preslar farm. Many have returned two or
 three times. This year, most inquiries have
 come from the United States. The Preslar
 farm is listed in the American Guide of
 Farm and Ranch Vacations.

In Ontario, the farm vacation business is



still in its infancy. Some people have been hosting for 13 years, but it's only in the past few years that farm holidays have been on an organized basis. The Ontario Federation of Agriculture got into the picture in the late 1960's when a number of Ontario farmers asked for assistance in the organization and administration of a promotional program.

Rae Cunningham, who administers the program, says its popularity is growing. Visitors now have their choice of 45 farms registered with OFA and listed in a travel guide distributed by the Department of Tourism. They range from farms like the Preslars' to modern dairy operations, poultry ranches, mixed farming enterprises and horse ranches. Mr. Cunningham says that 66 per cent of the inquiries received by his office are from Ontario, 7 per cent from the rest of Canada, 24 per cent from the United States and the

balance from overseas. About 20 per cent of the bookings are from repeat visitors.

Because of the growing interest in farm vacations, courses have been offered by at least two community colleges to train prospective farm hosts. The OFA also organizes a meeting once a year at which the hosts get together and talk shop.

Some, like the Preslars, have been agitating for regulations and standards to control the operators.

Last fall, a committee drew up minimum standards for prospective hosts and the OFA was asked to administer them. Emphasis was given to cleanliness and comfort as well as good old-fashioned hospitality. At the same time, the provincial government, recognizing that some farms would have to be upgraded, passed legislation which permits modernization grants for host farms wishing to raise their standards.

Questionnaires are occasionally mailed out to visitors by the OFA or the U.S. and Ranch Vacation Association asking for comments and suggestions.

While Mr. Cunningham says OFA's primary interest is improving farm income through the program, he notes that the benefits go much further. The program has also helped both farm people and urban residents to become better informed about each other's problems.

Many farmers, in fact, don't rely on the income they derive from paying guests but emphasize the pleasure they get from the sideline.

Says Mrs. Preslar: "We enjoyed last summer immensely with our guests and I really felt quite lost. We enjoyed their friendliness, congeniality, and their desire to assist when problems arose, such as a breakdown in our water supply for the cattle.

After a brief lesson in the art of hand milking and feeding the calves, Sandra and Kenneth Settatee discovered the hayloft for fun and games.



st guests come with a wonderful
ude toward rural life, but we feel they
n a great deal more each time they
We feel a closer bond between urban
and ourselves since we started having
ts."

ainly, some city-dwellers are real
phytes down on the farm. The Preslars
e hosted an Ontario family who decided
o fishing. They made their way to the
and tried vainly for several minutes
et the boat away from the dock. The
or would run, but they couldn't get the
to move. At first they thought the
s had been stripped, but finally they
vered they'd forgotten to untie it from
nooring. Another visitor insisted on
Preslar taking his bull outside because
anted a closeup photo of a real
eye.

One family, this time from New York,
discovered a bucket and trolley system
used by Mr. Preslar to move manure
from the cow barn. The kids decided it
would make an excellent cable car and the
odor didn't deter them one bit from
taking a ride.

"The children called it the sewer bucket
express and the name kind of stuck," said
Mr. Preslar. One six-year-old even wrote
a thank you letter and, in crayon, added a
colorful PS: "I loved the sewer bucket
express."

And so it goes. Some evenings, the Preslars
will sit around their living room enjoying
the warmth of a roaring fire and the equally
warm company of their guests. They
might look at slides, play cards or have a
sing-song. Occasionally, they'll thumb
through their collection of cards, some
from visitors they've had over the years.

Postmarks might include such far-off
lands as New Zealand or Rhodesia.

"We hear from many of them every year,"
Mrs. Preslar said.

Perhaps this note from a Long Island
family can best sum up the fun of an
Ontario farm vacation. After a 1964 visit to
Maple Lawn, the father wrote: "The trip
home was quiet — very quiet — and you
know how quiet that is for my family.

"Actually, this is what we have liked about
each farm vacation. We not only had
excellent food, fine lodgings, interesting
and beautiful surroundings for memories
but we leave behind some of our love. So
now when we say Sydenham (with a
short y) we not only mean a beautiful
geographic location but people we got to
know, respect and love."

BACK TO SCHOOL

Nearly 280 senior personnel of Ontario's municipal utilities went back to the classroom for a couple of sunny June days at the Association of Municipal Electrical Utilities conference for management at Thunder Bay's Lakehead University.



With the theme "Your Utility as a Business," the conference was held in conjunction with the university's school of business. Said by AMEU President A. L. Furanna to be five years in the planning, the meeting centred on the everyday operation of a local electrical utility, although many of the studies went into great detail.

Like, for example, a session on budgeting in which Professor Douglas Peters steered the discussion through such techniques as budgeting by project as against departmental budgeting and through the methods best-suited to the utility for long-range budgeting.

A finance session, headed by professors Mike Zablocki and Art Hensel, was generally concerned with raising capital and was based on a hypothetical case study. Delegates even looked at the stock market as a source of revenue. And in a session on purchasing, led by Professor Walter Crowe, participants looked into efficient purchasing techniques, scheduling of payments and deliveries and the pros and cons of quantity and tender buying.

Special attention was given to the vendor in relation to the utility, such as rating, evaluating and what criteria are used to select a vendor.

In a session on marketing, headed by professors Tony Seuret and Douglas Alexander, the problem was one of designing an advertising campaign for an all-electric comfort package — including electric heating and air-conditioning.

Delegates were told they must first decide whether they intended to promote just room air-conditioners, and create an awareness of these units, or whether they wanted to "push" central systems, and create a similar awareness of their existence.

In either case, it was imperative that the utility differentiate between its marketing and communications objectives, said the professors, and decide on what role advertising was going to play in its marketing program. Neither should managers be afraid of a little marketing research before they undertook any promotion within the utility.

A highlight of the conference was an afternoon devoted to simulated exercises or "management games." Delegates were divided into two groups, one of them working out a computer-based financial problem in which seven decisions had to be made based on two simulated years of operation of a utility. The other group was to solve 20 problems without the aid of a computer.

The problems dealt with everything from finance to personnel, including whether the manager of a small utility should be promoted to a more senior position in a larger utility.

"If delegates came away with just one or two ideas which they could implement in their own operation, then that's all the university were looking for," said Professor Crowe after the conference wound up. □

utilities big business

Taking up the theme of this year's conference, Andrew Frame, president of the OMEA, emphasized that a utility is not just a business — a very big business.

AMEU president A. L. Furanna, centre, welcomes Ontario Hydro chairman George Gathercole and OMEA president Andrew Frame to the annual summer conference at Lakehead University. Mr. Gathercole and Mr. Frame were among the speakers at opening night sessions.



...king to AMEU delegates, Mr. Frame
...utilities must operate an efficient
...ness. He called on his OMEA col-
...ues to "stick to policy and let the
...agers manage.

...representatives of the public in this
...ness are the elected commissioners.
...commissioners take responsibility for
...ing the policy of this business. Man-
...s and engineers, as part of the manage-
...t team, carry out this policy.

...alize that not all municipal utilities
...operating this way. I am the first to
...t that within the OMEA we have yet to
...ince some commissioners to stick to
...y and let the managers manage.

...the other hand, not all managers stick
...managing, some do get involved in
...Conferences such as this allow
...members of the AMEU to broaden
...management skills and lessen the
...- or the excuse - for commissioners
...se part in management," Mr. Frame

He added that in Ontario "we are on the threshold of regional government - and this means expanding municipal utility operations. It means that more than ever we are going to be under the scrutiny of senior governments. It means that more than ever we will be required to account to the public for our operation of the municipal utility system.

"I am very confident that we are going to survive the transition from the system founded 60 years ago into the 1970's when there will be fewer, but larger, municipal operations

"I am confident that independent municipal electric utilities will survive, that they are the best way for Hydro in Ontario at the distribution level. I am confident that with the help of efficient progressive-minded managers and engineers, our municipal utility system will grow and prosper," Mr. Frame said.

He called for support of Ontario Hydro by the two associations, urging them to endorse long-range construction programs in order to "prevent what's happening south of the border."

He reminded delegates that electric power shortages are prevalent in the U.S. and the situation is worsening. "Don't let the time come in Ontario when we find ourselves in the same mess," Mr. Frame urged.

hydro, universities must bridge gap

Ontario Hydro Chairman George Gathercole called on both Hydro and its associated municipal electrical utilities to "increase the scope of co-operative efforts with the province's universities."

Mr. Gathercole told delegates that universities have always been "a great treasure house of learning, and of testing, but the Hydro family has not made enough use of the facilities they offer

"The time has come when we must learn to co-operate with our critics - many of whom come from the student bodies of the various universities. They have environmental concerns, and we must strive to

Co-hosts at the summer conference included Lakehead University president Dr. William G. Tamblyn and Thunder Bay Hydro's general manager Walter Dolman. Opposite, Wallaceburg Hydro general manager Miles Duffus (closest to camera) and assistant superintendent Anton Schuurman wander approvingly around the university campus.

bridge an understanding of our operation with those who criticize.

"There are those who suggest that because of our need to burn coal and oil in our generating stations, we should restrict the use of electric energy. But my belief is that if we do that, we would cause even more pollution — and a much less satisfactory economy.

"We do not have a mandate to provide electrical energy in a frivolous way — but a mandate to provide a service. Society, it must be remembered, does not function satisfactorily without an adequate supply of electric power," Mr. Gathercole said. The Hydro chairman predicted that economic growth in 1971 will bring about an increase of 7½ per cent in peak demand. □

mix work and study — Tamblyn

University students should be encouraged to pursue their post-secondary school education on a part-time basis "rather than spending three to seven years at university in one solid block following right on the heels of 13 years of elementary and secondary schooling," says Dr. William G. Tamblyn, president of Lakehead University.

Dr. Tamblyn said students should be encouraged to take their post-secondary education "in smaller chunks."

"These chunks should be interspersed with periods of work. This approach to higher education would have the benefits of practical experience, increased maturity, and a greater degree of self-sufficiency," Dr. Tamblyn pointed out.

Such a program would place greater emphasis on the student paying his own way. "A scheme whereby a student would be responsible for paying a much greater share of the actual costs of his education would generate a more serious and dedicated approach to his studies.

"Such schemes are already in the planning stages and would impose a surtax on graduates which, over a period of 20 or so years, would largely offset the public investment in the students' education," Dr. Tamblyn said.

Likening universities to utilities, Dr.



Tamblyn suggested that because they both serve the public their problems, and their criticisms, are similar.

"But," he said, "the essential problems and questions which face our universities are, in large measure, a function of size.

"The post-war history of post-secondary education in Ontario is one of which the people of this province can be justifiably proud," he added. "In the mid-1950's, there was a system of provincially-assisted universities which numbered only four, and which accommodated approximately 20,000 full-time students. Government operating grants for these four universities, as well as for other types of post-secondary educational institutions, totalled less than \$10 million in 1954.

"By 1970, there were 14 provincially-assisted universities, a system of 20 colleges of applied arts and technology in addition to Ryerson Polytechnical Institute, and a number of regional schools of nursing. There were roughly 160,000 full-time students enrolled in these various institutions, over 140,000 of them in the uni-

versities. The universities were also serving more than 60,000 part-time students and government operating grants to universities in 1969-70 totalled \$263 million with a like amount being expended on other types of post-secondary and adult education.

"When these figures are added to the \$100 million for capital development, \$100 million of which went to the universities, we find a total cash flow in 1969-70 of over \$700 million from the provincial purse alone — half of which went to the universities," Dr. Tamblyn said.

"However," he added, "people are coming to the realization that this accelerated rate of growth has not yet peaked but that it will, in fact, continue through the 1970's. Post-secondary education in Ontario, as in most jurisdictions in the western world, has experienced unprecedented growth.

"This precedent is about to be repeated. The Economic Council of Canada has estimated that by 1980 there will be

Among those attending District 5 OMEA meeting at Simcoe were D. Dixon, commissioner, and G. Klager, chairman, both of Fonthill Hydro.



225,000 full-time students at Ontario universities. And this estimate, which is more than a doubling of enrolment in just five years, is considered to be too conservative by many other experts.

An economist attached to the Council of Ontario Universities has estimated that an extra \$1 billion a year will be required by 1980 to operate the Ontario university system. In other words, we will have to provide, in the next decade, more university buildings and more student places than we have built since Confederation."

The most obvious and perhaps most serious of the problems facing universities is to meet the challenge of the future, Dr. Tamblin, was the question of financing.

Can the people of Ontario able, or willing, to fund their universities at a level approaching \$1 billion a year? Are they convinced that the benefits which accrue from university education for so many people justify such an expenditure? Will there be sufficient employment opportunities for these students?" □

district 5 OMEA

Niagara will set the stage, says Frame

OMEA President Andrew Frame predicts that when a new utility setup is established in the regional municipality of Niagara it will set the pattern for municipal Hydro throughout the province.

Mr. Frame made his remarks in an address prepared for a meeting in Simcoe of OMEA District 5. However, he was unable to attend the meeting and George Butcher, of Simcoe PUC, read the report.

Delegates from 35 municipal utilities in an area bounded by Niagara Falls in the south, Brantford in the north, Burlington on the east and Port Rowan on the west attended the meeting.

In his talk, Mr. Frame singled out the

Niagara regional government situation as a pilot project and emphasized the need for a quick settlement of proposals for a new utility setup there.

"There has already been a 20-month delay," he said, "since the original Niagara region bill was introduced. Our existing commissions cannot afford any further delay. They need to know the future of Hydro in their region and do proper planning, and it is essential for staff morale to know what action will be taken."

Mr. Frame said meetings would continue between the OMEA's Government Legislation Committee, Ontario Hydro and the municipal utilities affected in order to resolve the situation.

The OMEA is sticking with its original request for supplementary legislation in the Niagara Region Bill to set up immediately municipal utilities at the second-tier level. The association wants seven of the 11 existing utilities retained.

"The Government Legislation Committee and the whole OMEA board of directors are watching the Niagara region situation



very carefully. They consider the decisions made here are extremely important since they will set a pattern for further action around the province," Mr. Frame added.

The president said he was honored to be representing the OMEA on Task Force Hydro, a group established by the Committee on Government Productivity to assess Ontario Hydro's efficiency, effectiveness and responsiveness. "I feel also that the results will show it to be worthwhile and it will make a significant contribution to the progress of Hydro in Ontario."

The importance of public relations in implementing rate increases was stressed in a panel discussion on power costing.

Panelists were C. H. Lusk and E. H. Burdette, of Ontario Hydro, and Archie McGugan, of Palmerston PUC, president of District 6.

Mr. Lusk and Mr. Burdette outlined various technical aspects in determining the cost of power to the utilities. Mr. McGugan gave the utility viewpoint and called on delegates to put increased emphasis on public relations.

"Municipal utilities are being questioned as never before on why this so-called 'monster', Hydro, can take the public's hard-earned money when rate increases are announced," he said. "The customer has no understanding of this great Hydro family. We must sell to our customers the fact that we are buying electricity at cost and at a very low cost compared to other parts of the country."

Mr. McGugan's remarks were echoed in an address by W. G. Keller, consumer service superintendent for Ontario Hydro's Niagara Region. It is important, he said, that utilities cultivate contacts with the public and be able to explain rate increases properly and give advance warning if possible.

The planning and timing of increases were also discussed.

Members of the OMEA-AMEU public relations co-ordinating committee attended a dinner that followed the meeting. They had been on a tour of Niagara Falls and Nanticoke generating station, arriving at Simcoe in time to meet briefly with delegates. □

"We must emphasize PR," says Archie McGugan, president of District 6 OMEA. Seated are C. H. Lusk, left, and E. H. Burdette, both of Ontario Hydro.

long hydro res

iamond jubilee

nto Hydro this year marks its diamond jubilee and, as a sort
th birthday present, is giving itself a new look around its
quarters building.

airman Richard Horkins says the Carlton Street building is
40 years old and "we want it to meet the standards expected
first-class office building and to reflect dignity, good taste
practical efficiency." To this end, he adds, there will be some
ting changes" to the interior.

According to Assistant General Manager Bruce Prentice, plans
or the installation of electric heating and air-conditioning
the office landscaping principle will, in all likelihood, be
ved. Renovation work is expected to start in the fall.

rt of the utility's new image will be the creation of an
oyee suggestion plan "to give employees an opportunity to
ipate in shaping the future of the new organization." □

EU engineer retires



and S. Coles

Raymond S. Coles, for the past 11 years
engineering consultant to the Association
of Municipal Electrical Utilities, has taken
early retirement.

Mr. Coles joined Ontario Hydro's engi-
neering division in 1947 and held several
important posts in the electrical engineering
and stations departments until his appoint-
ment as project engineer, distributing
stations, distribution department.

During his association with the AMEU,
Mr. Coles was responsible for the collation
of information on the latest engineering

iques relating to the design and construction of municipal
rical systems. □

Rae memorial centre

board of governors of Sir Sandford Fleming College in
borough has named its College Retraining Centre after
io Hydro's former second vice-chairman, the late Ian F.
ae.

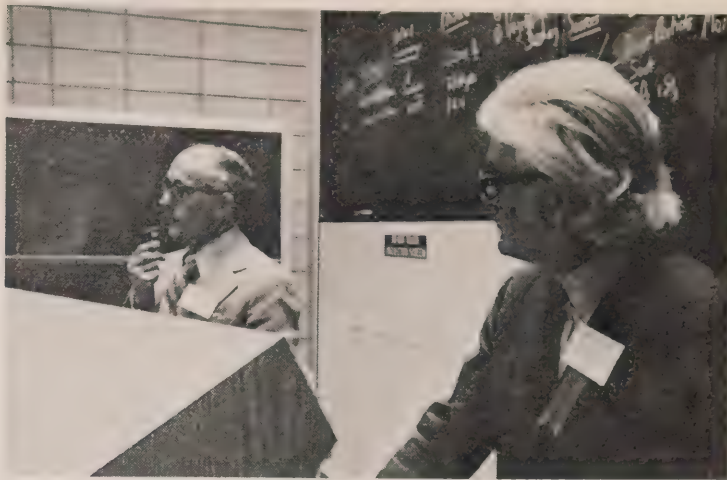
n in Vancouver, the son of a sea captain, Mr. McRae was
sic example of business success the hard way. He attended
school in his home city, was attracted to the study of
icity, and finally took the advice offered him to "go east
eek a place with one of the large electrical manufacturing
anies."

ore his retirement, Mr. McRae had achieved the position of

chairman of the board of Canadian General Electric.

Although he never attended a university, Mr. McRae qualified
as an engineer and received an honorary doctorate of science
from Laval University.

Hydro teach-ins



Weather eye on pollution

More than 800 teachers and education officials participated in
the first year of a unique environmental education program
developed by Ontario Hydro.

Eight seminars, each attended by approximately 100 teachers,
were held throughout the province beginning in February and
winding up June 16 at Brock University, St. Catharines. It is
estimated that upward of 240,000 students will have been
exposed to the program through the participation of their
teachers. Jim Black, co-ordinator of the seminars, says teacher
workshops and student forums will be included in an expanded
phase of the program in the 1971-72 school year.

Ontario Hydro's senior meteorologist, D. K. Gillies, is shown
addressing 85 teachers at the St. Catharines seminar while
Professor G. Potvin, of McMaster University's research unit in
urban studies, looks on. □

Freezers — hot item

Results of Ontario Hydro's 1970 electrical appliance survey indi-
cate that while about one-third of all single family dwellings are
heated by natural gas, about 70 per cent of these still use elec-
tricity for cooking and 40 per cent for clothes drying.

The survey also revealed an upward trend in the use of food
freezers in rural areas and in local systems. Hydro's marketing
division officials suggest there is a "comparatively greater useful-
ness for this appliance in rural areas and small communities than
in larger ones."

One of the real declines in appliance ownership is the clothes
washer. The market saturation figure fell from 90 per cent in 1960
to 80 per cent in 1970 and is attributed to the continuing swing
to apartments, condominiums and other forms of multiple family
dwellings.

Questionnaires were mailed to 50,222 households in rural areas
and 60,940 homes in 152 municipalities across the province. □

Pressure continues

The constant pressure of what is fundamentally a growth
economy must continue to be a basic factor in Ontario Hydro's
plans, says Chairman George Gathercole in the recently released
short annual report.

"It is true that primary demands both in November and Decem-
ber were slightly below forecast figures, owing in part to a

generally lower level of economic activity and to strikes in sections of the automobile industry. Primary demands in December, nevertheless, were nearly 7 per cent higher than those in 1969," Mr. Gathercole says.

Hydro's customer count reached a new high of 2,388,561 in 1970, an increase of about 45,000, the report states. The peak demand last year was 11.3 million kilowatts, an increase of 6.9 per cent over the 1969 peak demand. During the year, Hydro brought into service 1.2 million kilowatts of new generating capacity to reach a dependable peak capacity of 12.6 million kilowatts for the province-wide system. □

Looking back



George C. Allen

Few people can look back on 55 years' association with Hydro, but one of them is George C. Allen, vice-chairman of Sarnia Hydro.

Although only a commissioner for the past five years, Mr. Allen spent half a century as an employee of Ontario Hydro. He joined Hydro in 1916, and held various positions during its formative years. He became area manager in Sarnia and retired in 1959. Now, at the age of 77, he remains active as an elected commissioner.

"I found my heart was still with Hydro so I ran for the commission in Sarnia in 1966," Mr. Allen recalls. He served as commissioner and then as chairman. He is now vice-chairman, and still going strong.

Mr. Allen was born in St. Thomas in 1894 and attended the Balaclava public school there. By some coincidence, he and two of his classmates ended up with Ontario Hydro, each of them as area managers. The others were B. H. Hankinson and Roy Adderman.

At an early age, Mr. Allen became interested in electricity and became a qualified journeyman electrician. He studied at the Scranton Schools and specialized in a course on electric railways. Although electric railways didn't boom as had been anticipated in the province, the knowledge he gained helped in his later work.

Problem of costs



D. J. Gordon

There's little doubt that the cost of electric power in Canada will continue to increase, and the cost of money will remain high, says Ontario Hydro's General Manager D. J. Gordon. Mr. Gordon was recently elected president of the Canadian Electrical Association, a group representing utilities and major electrical manufacturers across Canada.

Using Ontario Hydro as an example, Mr. Gordon suggested that in addition to the cost of borrowing money and plant construction, the battle to eliminate pollution

is a growing item on Hydro's budget.

"Ontario Hydro has spent \$58 million over the past 20 years on air quality control measures at its coal-fired generating stations alone," Mr. Gordon says.

He added: "We're spending \$6 million to convert the R. L. Hearn plant from coal to natural gas to cut down on pollution, a conversion that will add \$3 million a year to operating costs.

"Hydro's capital construction program this year will cost \$600 million — and borrowing this money is becoming expensive. In 1950, Hydro could borrow at 3 per cent, by 1965 the interest rate was 5.25 per cent and last year it went as high as 9.5 per cent," Mr. Gordon said.

And he predicted there will be a movement in Canada, as has been in the U.S., to prohibit new plant development because of environmental considerations.

"Look at New York City, and the problems they're having siting new plants and raising rates for new construction. This type of pressure some time in the future is going to create a shortage of power and what people forget is that utilities have to commit plant construction eight to 10 years in the future," Mr. Gordon added.

"When you look at the past — and into the future — the increases in industrial productivity are accomplished by using more electricity, not less. We must help people to understand our problem," Mr. Gordon told his CEA colleagues.

municipal briefs

Clifford Hydro has joined the Ontario Municipal Electric Association, bringing OMEA membership up to 340 with only 14 missions now non-members. Clifford's enrolment means District 6 now joins Districts 4, 5, and 8 in having 100 per cent membership.

John Dawson, who's headed the AMEU's streetlighting committee for a number of years, has been named manager of Niagara-on-the-Lake Hydro. He has been with Dunnville since 1950 and was instrumental in bringing to that community Ontario's first underground distribution system. Mr. Dawson recently returned from an International Electro Technical Committee seminar in Stresa, Italy. He and a Dr. Schwarz, of the same committee, were the only two accredited delegates from the Western Hemisphere.

Brantford PUC has called for tenders for the construction of an electrical department service centre on its waterworks property in Homedale. The centre is planned as an addition to the utility's bus depot and will replace existing meter department, transformer maintenance and general maintenance quarters.

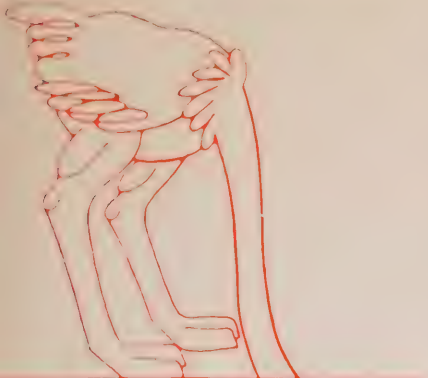
Although it's three years early, Meadford PUC has started the rolling with plans for the town's centennial celebrations. The commission has decided to set a new substation in a park area at the southeast entrance to town. With its attractive arrangement in the shape of the Hydro symbol, shrubs, decorative lighting, the new area will be called Kilowatt Park. What else?

Around Cochrane PUC, the girls are look-alikes. The four members of the utility's distaff side got together and decided identical outfits would be more businesslike. The result is they now wear either mauve pantsuits or sky-blue A-line midis to the office. What's more, it's been reliably reported people now don't make half the fuss about parting with money for the Hydro bill.

Recognizing the importance of ratepayers' groups, Oakville has decided that general manager Ross Lamb will attend ratepayers' association meetings to explain the commission's policies and hear suggestions for improving its service to the municipality.

North York Hydro workers are back on the job after ratifying an agreement which ended a 10-day strike in late June. The new year agreement calls for a 1971 wage increase of 7.75 per cent and a 7 per cent pay boost in 1972.

Aylmer PUC's superintendent for 32 years, Stewart McBurnie has retired. Mr. McBrien joined the utility in 1939 after serving with Ontario Hydro. His retirement plans call for fishing, a little travel, and refraining from jumping every telephone rings."



Don Wright sees it

ps from the four corners of the world regularly into Toronto harbor with automatic cargoes of rare spices, fine teas and exotic perfumes. None of these can be held responsible for a nauseous but pervasive odor which has descended upon the eastern waterfront section of the city, like a drop of mercury, refuses to be disappointed. Sewage treatment rather than frankincense is suspected, though, and some of the finest noses in the metropolitan area may be recruited in an effort to track it down.

According to one report, consideration is being given to the formation of an environmental control squad" whose duty it will be "to search for odors near sewage disposal plants."

The idea seems sound, but the terms of reference should be extended. A bad smell is a bad smell and whether it emanates from an individual or a corporation or a municipality it should be sniffed and snuffed out or at least up-graded. Success will depend, of course, on the competence of the individuals making up the task squad and those doing the recruiting. It will be well advised to consider qualities above and beyond the length, breadth and mobility of the applicants' proboscises. We want something better than malformed anteaters. Sensitivity, perseverance, bilingualism and a general sensitivity toward nosiness are among the qualities taxpayers can expect from first-class, highly-paid Offensive Odor officers.

Meanwhile, the work has been left in the hands of amateurs. Volunteers in the affected area are being asked to sniff the air at regular intervals and record their findings on special calendars which have been provided.

The small Quebec municipality of Saguenay has already established a precedent for what can be done in the way of legislation for controlling odors on a more national level. A local youth who wandered into a town restaurant after having

richly anointed himself with a perfume called patchouli ran afoul of Bylaw 383. He spent 15 days in the hoosegow for contravening this edict, established earlier in the year to "prevent anyone disrupting law and order with noise or smells."

Seems a bit drastic, perhaps, to clap a chap in the sneezer for wearing perfume but patchouli appears to be something else. Every customer in the restaurant at the time was forced to flee and the scent was deemed to fall within the bylaw's definition as being disagreeable, foul, nauseous and of an injurious nature dangerous to health.

■ Offensive odors have also been plaguing England lately and the electrical supply authorities have been receiving complaints that the rich aroma of dead fish was emanating from electrical sockets. Suspicion first centred on the quality of the electricity being provided. Some claimed it was old and full of dead ohms and dying amps.

One frenzied customer ripped up all his floors, flushed all his drains, stripped the cupboards and had his whole house scrubbed and disinfected in an effort to eliminate the stench. It was finally traced to material used in a particular kind of lamp socket. As soon as the bulb heated up, the dead fish came to life and it was only necessary to fit new retaining rings in the lamp to put the whole matter at rest.

■ Harping back to Toronto for just a moment, we might mention that bad smells are not new. N. P. Willis, an English travel writer who journeyed through Upper and Lower Canada in the 1830's, gained this impression:

"The situation of the town is very unhealthy, for it stands on a piece of low marshy land, which is better calculated for a frog pond or a beaver meadow than for the residence of human beings. The inhabitants are, on this account, much subject, particularly in spring and autumn, to agues and intermittent fevers. . . . He who first fixed upon this spot as the site of the capital of Upper Canada, whatever predilection he may have had for the roaring of frogs, or for the effluvia arising from stagnant waters and putrid vegetables," etc., etc., etc.

However accurate his description, Mr. Willis isn't likely to have improved the tourist trade nor won the admiration of our Bogtown Chamber of Commerce.

■ Never one to boot a fellow when he's in trouble, we cannot resist reference to a mammoth ad which appeared in a recent issue of the New York Times. It said:

"If Con Ed had bought Big Allis from A & P they could get their money back."

Big Allis, of course, is the giant 1,000,000-kilowatt generating unit from which the utility has been experiencing some difficulty extracting bugs. Merchandise of this proportion obviously has no place on supermarket shelves. Or has it? The chairman of the New York State Public Service Commission recently dubbed the poor Allis "a lemon."

■ Separate incidents in England suggest that at least two ladies are fed up cooking with gas. In Stratford-on-Avon, a woman who had been "making perfect bread for 12 years" complained to her local gas board that since switching to natural gas her bread emerges from the oven soggy.

And Winifred Smith, of Luton, is not exactly ecstatic over the treatment she received from her gas board after suffering injuries from an exploding stove. Apologizing for the faulty fitting which had caused the explosion, the board presented her with a bunch of daffodils.

Nice, mind you, but in a case like this the board should have been prepared to weather charges of extravagance and sent roses. Soggy bread isn't surprising since England gets most of its natural gas from under the North Sea and it's probably still damp.

■ We have nothing but admiration for those people who, upon undergoing a strong emotional experience, seek a release for their feelings through poetry. Avid readers will recall how we recently described the love rituals of the three-spined and ten-spined variety of sticklebacks with the astonishing revelation that these closely related fish never, never intermingled. Our correspondent has written a multi-versed lament to an imaginary three-spined stickleback lady who did succumb to the advances of a 10-spined fellow and, while it is not our policy to reproduce poetry, the excellence of this work warrants an exception.

Once thrilled by the tickle
Of a ten-spined stickle,
There's no going back
To the three-spined kind.

Once melted in the milt
Of a love-smitten smelt,
There's no going back
To the ten-spined kind.

Oh brand me quite fickle
But just see how quick I
A lady be ruined by chance —
Once she's joined in the dance
With that amorous ten-spined kind.

On second thoughts, we'll stick with our anti-poetry policy in the future. □

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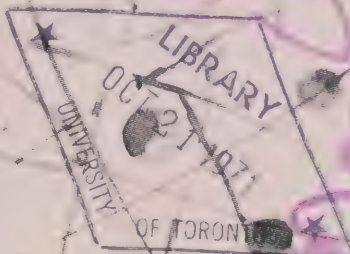
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the cover

Our artist's view of the microcosm seemed a fitting cover for this issue, which contains an article (page 12) on the steps involved in bringing the first nuclear-driven unit at Pickering generating station up to full power.

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water over the dam

It was 13 years ago that the waters of the St. Lawrence River began to rise behind the new man-made barrier near Cornwall, flooding the historic Long Sault Rapids and creating a lake 100 square miles in area. The end was drawing near for a project which had occupied the minds of imaginative men for half a century and challenged the ingenuity and technology of Canada and the United States.

How can this formidable undertaking be compared with the much less spectacular arrangement of pipes and pumps and electrical components being fitted together for the production of nuclear power at Pickering generating station? In some respects, the St. Lawrence development is dwarfed by the comparison.

For one thing, Pickering is much bigger and more costly. Eventually, it will produce 2,160,000 kilowatts as compared to 912,000 kilowatts from Ontario's share of the St. Lawrence. Each unit at Pickering will be equal in capacity to nine of the machines at Cornwall. And each unit is infinitely more complex.

This is not to belittle the St. Lawrence power project. Many of the problems associated with this development were unique and enormous. But the basic technology involved had been proved for many decades.

Pickering is another matter. All nuclear power technology is new. The first nuclear power plant of commercial size anywhere in the world commenced operating in Britain in 1956. And the CANDU concept, entirely Canadian, first proved its feasibility, virtually on a laboratory scale, when NPD went into service less than 10 years ago.

Pickering is one of the largest nuclear plants in the world, and considering that design and construction precedents were largely absent, the project must be regarded as among the greatest engineering and technological accomplishments this country has chalked up to date.

The St. Lawrence project marked the close of a colorful era and one of the things Hydro misses most about the "good old days" of river stations is instant reliability. For the most part, these units were considered dependable once the rotor began to spin.

Larger and more complex, the new thermal-electric units, whether fossil-fueled or nuclear, are subject to more frequent outages in the early stages and they are not considered "mature" for several years.

So far, the performance of the first unit at Pickering has been most satisfactory. It would be unrealistic, of course, to expect a complete absence of teething problems with this or with subsequent units.

Whatever direction the program may eventually take, nothing can erase the lustre of the Pickering achievement. At the same time, there is a need for Hydro to constantly and carefully assess the means by which it will meet the future power requirements of the province.

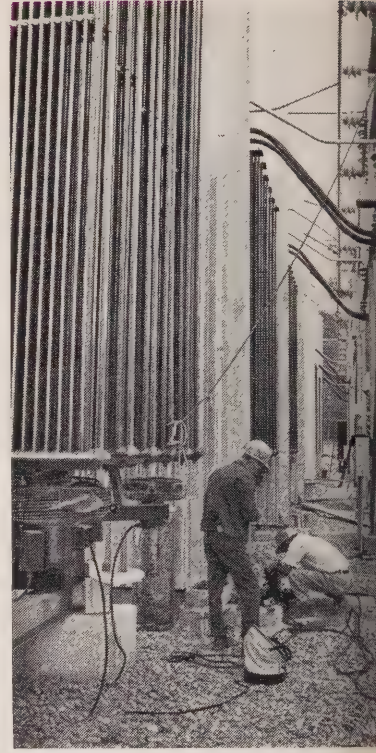
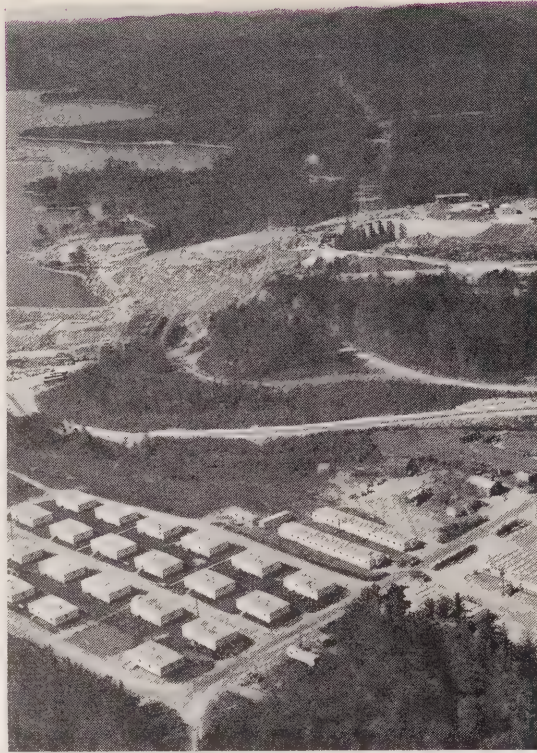
It is interesting to note that the Central Electricity Generating Board of Great Britain will undertake a detailed assessment of light water reactors. Quoting from the July edition of Power News, the Board's staff publication, "Britain's nuclear power industry is undertaking a detailed assessment of light water reactors, which are widely used abroad, so that a well-informed, up-to-date comparison can be made with British reactor systems."

Considering Britain's experience and heavy investment in gas-cooled technology, the assessment of the reactor type favored by the Americans and other countries underlines the obligation all utilities share to keep an open mind with regard to all aspects of the power supply business. □



lower notch... the twilight plant

Around rush hour on a chilly winter's evening . . . that's when Ontario's latest hydro-electric generating station will be doing its thing.



by Bob Morrow — photos: Ron Brown

Water impounded in a scenic man-made lake will soon rush through twin turbines at Lower Notch, a \$69.3 million generating station overlooking Lake Timiskaming near the mouth of the Montreal River.

But the heady days of hydro-electric power development in Ontario are just about over. Lower Notch is the last hydro-electric project in Ontario Hydro's current construction program.

The station, located 22 miles southeast of Cobalt in an area rich in silver mining and Indian lore, is expected to deliver first power next month. Its tree-fringed headpond winds 14 miles up the river valley. Yet, except during periods of high flows, most of the water will pass through the turbines in about two hours, providing 228,000 kilowatts to help meet peak demands on the system, which in winter occur about 5.30 p.m.

Two old upstream plants, Upper Notch and Fountain Falls, which had a combined output of 11,600 kilowatts, have been dismantled. Their empty shells are now beneath Ontario's newest lake.

With the completion of Lower Notch, Hydro will have 68 hydro-electric stations in service, ranging in capacity from the tiny 800-kilowatt Galetta plant on the Mississippi in Eastern Ontario to the 1.4 million-kilowatt Sir Adam Beck-Niagara No. 2 station. Because of their ability to provide electricity at a moment's notice, many of these stations are used to meet the shifting peaks in demand in contrast to fossil-fuel and nuclear plants, which are more suitable for supplying Ontario's basic load.

During the past 10 years, nearly 1.5 million kilowatts of peaking power have been developed in Northern and Eastern Ontario on the Abitibi, Mattagami, Madawaska, Mississagi and Montreal rivers.

This program has involved eight new plants and extensions to two existing stations, all unmanned and remotely controlled.

Lower Notch will be remotely controlled from the new Dymond transformer station near New Liskeard, about 35 miles away. Dymond TS will also control the nearby Matabitchuan and Hound Chute stations

and the unique Ragged Chute air plant, which has supplied compressed air to mines in the area since 1910.

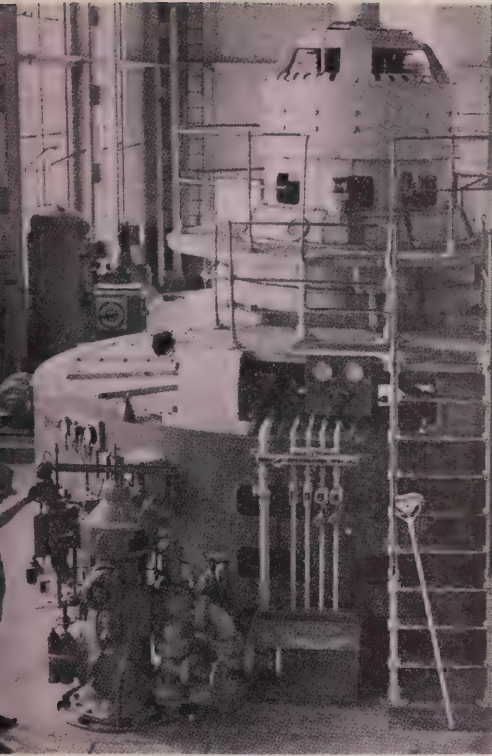
A maintenance headquarters, which will serve crews handling electrical maintenance in generating plants and transfer stations in the vicinity, has just been completed beside Dymond TS.

Although last in line, Lower Notch represents an outstanding engineering achievement. Twelve years ago, a 25,000-kilowatt run-of-the-river plant was contemplated on the Montreal. By building a peaking plant which can store water for release at specific times, more than 10 times as much power has been tapped.

H. G. Acres Limited, designers of power projects around the world, are in charge of engineering and supervision of construction at Lower Notch. Fittingly, the firm was founded by the late Harry Acres, Ontario Hydro engineer who supervised the construction of Wasdell Falls, Hydro's first project in 1914, and Sir Adam Beck-Niagara No. 1.

The main civil contractor is Pitts-

Photos, at left, show upstream portal of diversion tunnel before headpond flooding, an aerial view of the Lower Notch colony and work on Dymond transformer station, remote control point for the new plant. Below, operator adjusts 1914 generating unit at Upper Notch while crew salvages equipment from the plant, one of two flooded out by the project.



ara-Atlas, a consortium of con-
n firms formed for this undertaking.

ject was contracted out in 1968
e Hydro's own design and con-
n staff were heavily engaged in a
program involving 7.5 million
ts of nuclear, fossil-fuelled and
electric capacity.

statistically-minded, Lower Notch's
am is 2,200 feet long and 180 feet
d spans the river a mile upstream
like Timiskaming. It contains about
00 cubic yards of material.

s conveyed to the intakes through
-foot-long power canal, 100 feet
d 60 feet deep. The massive con-
adworks, embedded in a rocky
ent overlooking the lake, resemble
n fortress. Below, twin penstocks
ater to the neat aluminum-clad
puse. Excess water will flow down a
t-long concrete spillway and
into the lake.

to visualize now, but this pic-
setting reminiscent of a summer
as once a battleground where

Indian bands fought over hunting and
fishing rights. An ancient Indian burial
ground beside the river mouth has been
fenced off to protect it from all the
construction activity.

During the summer, student archeologists
sponsored by the University of Toronto
and financed by grants from the Canada
Council and the National Museum con-
tinued to explore remains of Indian camp-
sites dating back to about 5000 B.C.
They have found such artifacts as arrow-
heads, pottery and crude stone tools from
three distinct civilizations.

They also uncovered the remains of a
trading post built near the river in 1679 by
the Company of the North, which was
absorbed by the Hudson's Bay Company
in 1821. The post suffered continual raids
by Iroquois in the early years and was
washed away by flood waters in the 1880's.

The archeologists worked out of a base
camp set up beside the Upper Notch
station, upstream from the new station,
until the headpond flooding started last
month.

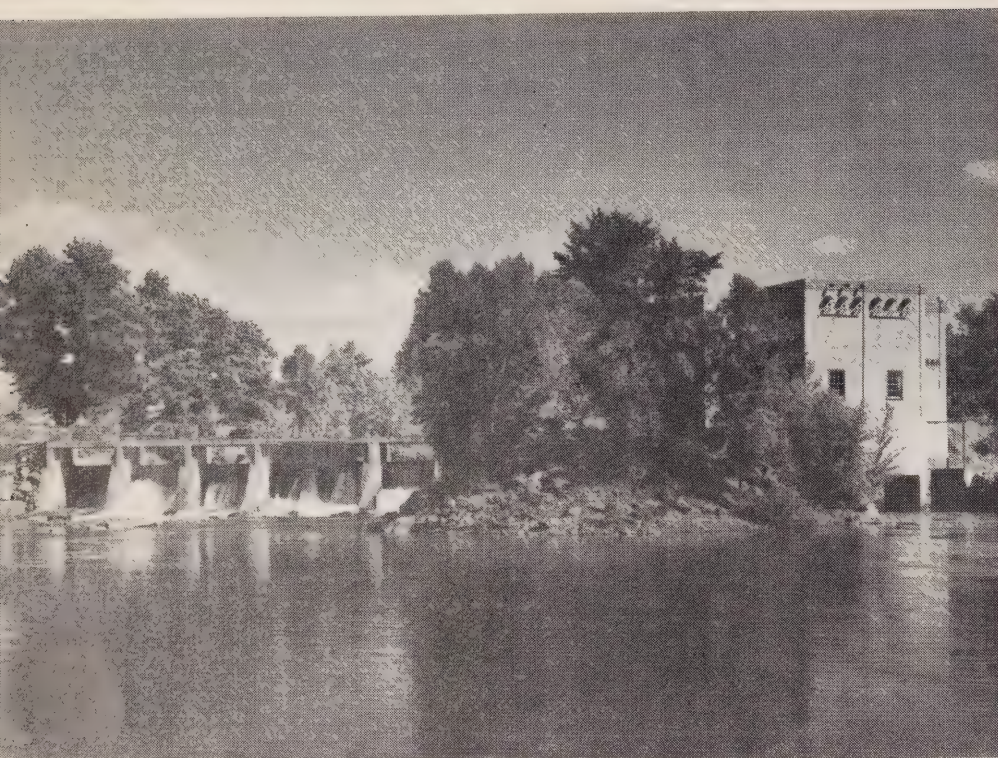
Before the Upper Notch and Fountain
Falls stations disappeared beneath the
surface, septic and oil tanks were pumped
out and flushed and equipment from the
power houses and their switchyards was
salvaged for use elsewhere. Much of the
superstructures was dismantled.

Both plants, originally built to supply
silver mines in the area, were taken over by
Hydro in 1944.

Unquestionably, the best-informed man at
Lower Notch is field engineer George
Cameron, who enjoys a unique position
as liaison man between Acres and the
Commission. He is the sole Hydro repre-
sentative on the site. On his frequent tours,
he wears an unadorned white hard hat and
habitually clenches a pipe between his
teeth

Mr. Cameron, a veteran of 22 years with
Hydro, has mixed feelings about the com-
pletion of Lower Notch. He worked on
the St. Lawrence development, the last
major source of hydro-electric power in
southern Ontario, and most of the sub-
sequent projects.

Scenic Wasdell Falls plant, completed in 1914, was the first built by Hydro. George Cameron, below, is a veteran of 22 years with Hydro and sole representative at Lower Notch, the last hydro-electric project in the current construction program.



Like many other Hydro employees and their families, he and his wife, Dorothy, recall with twinges of nostalgia days spent in the James Bay watershed — the unpredictable “Polar Bear Express” to Abitibi Canyon colony and the other swaying train ride to Little Long on the Mattagami. One of their prized possessions is a large Eskimo sculpture obtained for them by the Bishop of Moosonee.

But colony life has its compensations. After a day’s work at Lower Notch, he can sail his 15-foot sloop on Lake Timiskaming. And whatever the next assignment, George Cameron and his family are pretty adaptable — even if it means sailing again on Lake Ontario.

When power flows from the unmanned station, only site clean-up work will remain. No longer will the piping of the kildeer or the creaky-hinge cry of the blackbird be drowned out by the roar of heavy construction equipment, while in the nearby cemetery the bones of unsung Indian braves will resume their centuries-old sleep.

Hinging on economics, other hydro-electric projects may indeed be undertaken in Ontario. But, in the foreseeable future, the Montreal is the last of a long list of rivers tamed over the past six decades to provide hydro-electric power. □

silver lining for a new dam

No wonder silver strikes a quick conventional vein around the Lower Notch project.

The earth and rockfill main dam contains fine samples of silver-bearing ore which comes from the tailings of abandoned silver mines in the area. Other traces of precious metal were turned up in the borrow pits mined for fill to build roads and dykes.

In the early 1900’s, prospectors found slabs of silver sticking out of the ground near Cobalt. And although about 500 million ounces of silver have been mined in the area since the fabulous 1903 strike, people still talk of finding the mother lode.

According to legend, many years ago a prospector notched a tree to mark a rich outcropping of silver near the new generating station. But when he came back to stake his claim, he couldn’t find the tree.

Some people who continue to search in vain today suggest the prospector’s lost notch may now be some distance up the tree.

There’s speculation, too, that a silver vein will be found when fast-flowing water is diverted for the power project this fall.

For the first time a stretch of the ancient river gorge near the mouth of the Montreal River will be bared for inspection.

The winding gravel road to the doomed Upper Notch station passes through Silver Centre, a once-thriving community served by a railroad. Now it’s a ghost town — a few dilapidated shacks, overgrown foundations and rotting railroad ties. But, as the saying goes, hope springs eternal and exploratory drilling has resumed at two long-neglected mines a few miles from Lower Notch.

Rocks containing pink cobalt “bloom” usually found in association with silver can also be found in the new dam. It’s the same metal being used to produce radioactive Cobalt-60 at Pickering nuclear power station, primarily for cancer treatment.

For Ontario Hydro, however, Lower Notch’s “treasure” will come from the silvery torrent of water spinning the turbines to churn out more peaking power for the province this winter. But who knows in Rainbow Country? Now that Hydro access road has opened up the isolated area, someone may yet make another strike. □

Construction of the Robert H. Saunders–St. Lawrence generating station marked a flurry of building activity in the fifties.

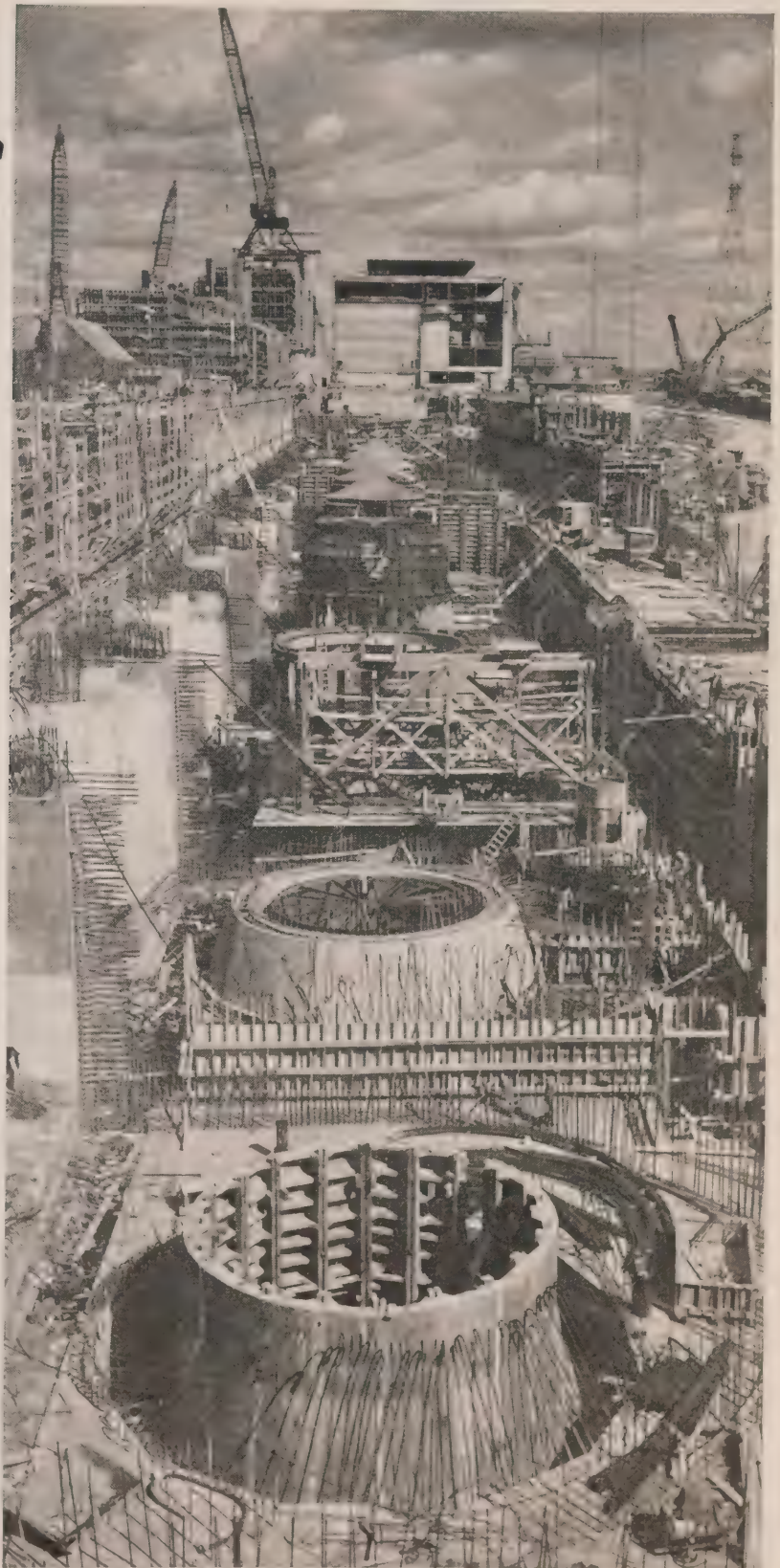
INTO HIGH GEAR

When the Second World War ended in 1945, Hydro had to shift into high gear to meet surging demands for electric power. Instead of the feared post-war recession, Ontario headed into its greatest period of expansion. Hydro rallied its resources to meet the pressing need for electric energy.

The Commission quickly cast off its wartime policy of limiting new construction to conserve manpower and supplies and launched a crash program to build new generating stations and transmission lines.

But, while Hydro and private construction forces pushed ahead at full speed with new stations, time was required to get them into service and periodic power shortages occurred, particularly in 1947 and 1948. Inevitably, Hydro was forced to restrict power supplies to large industrial customers and municipal utilities.

Shortages, in fact, were the order of the day – shortages of housing, new cars, and consumer goods that were accentuated by a high birth rate and a strong flow of immigrants from Europe.



Canada's first extra high voltage line was built to carry power at 500,000 volts from around James Bay to the Toronto area.

Nothing less than a revolution in the man-made environment occurred in the post-war era. While the rural population continued to shrink, housing subdivisions and factories sprang up on farmland around every city and municipalities were hard pressed to build schools, roads and other essential services.

"Mushroom" became the often-used verb to describe growing communities and, indeed, buildings seemed to sprout from the soil overnight. The Oshawa-Niagara corridor along Lake Ontario was dubbed the Golden Horseshoe; a strip of stores and factories along Eglinton Avenue in Scarborough became the Golden Mile.

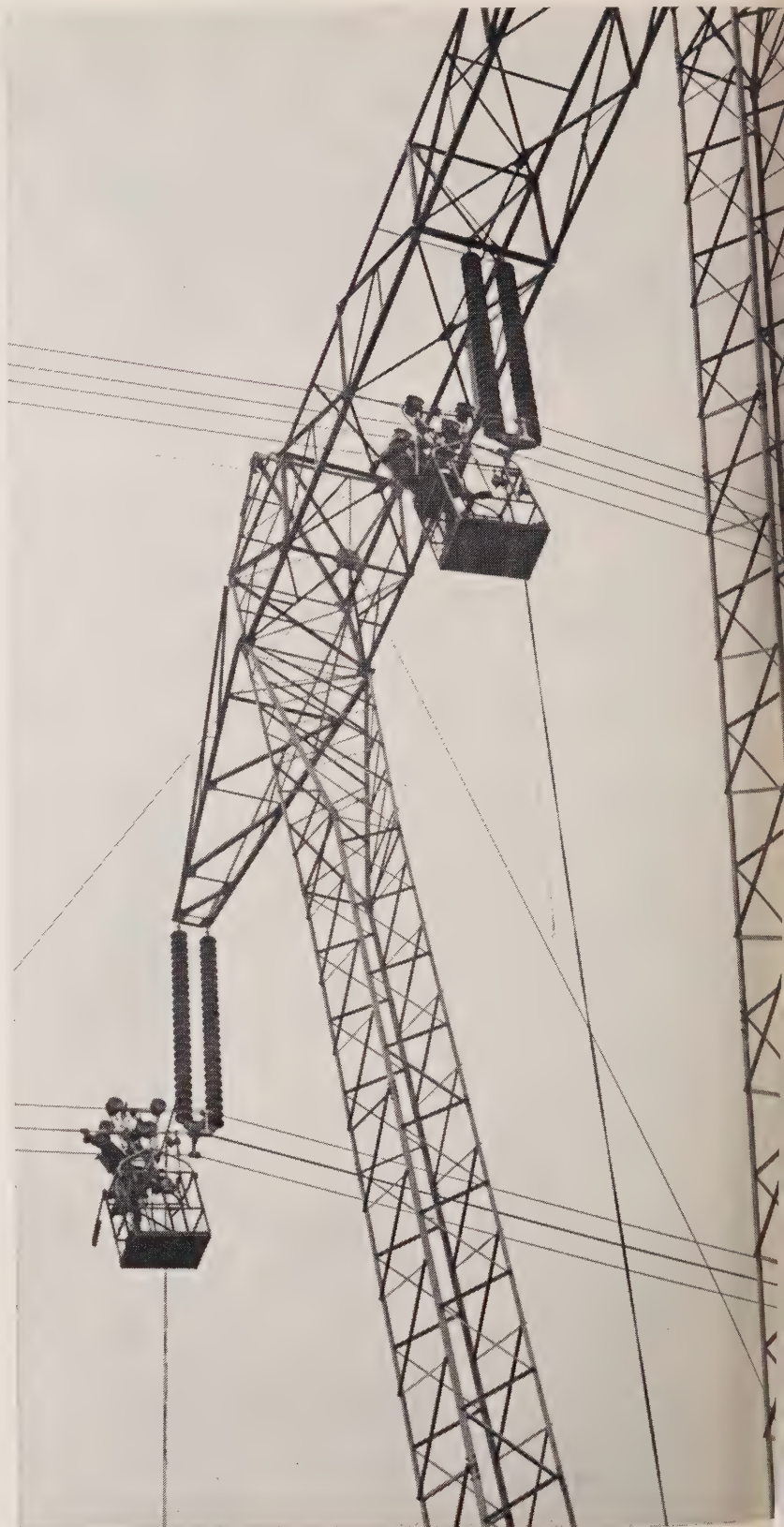
Hydro utilities were in a sound financial position to expand their distribution systems and keep up with the demand for service, including modernized street lighting. Some grew at an incredible rate. In 1950, for example, Scarborough PUC posted a 40 per cent increase in peak load over 1949.

The winds of change were also sweeping Ontario farms. In 1945, Hydro was serving only about 50 per cent of Ontario's farms. Yet a backlog of deferred wartime work and a shortage of farm hands spurred demands for electricity to operate labor-saving devices.

Hydro responded by starting a five-year program to extend rural lines in all parts of the province. By 1950, the number of rural customers had doubled and rapid expansion continued throughout the decade. Even residents of remote northern Ontario communities were able to discard kerosene lamps and install electrical appliances.

Rural lines were also extended into cottage and resort areas which attracted increasing numbers of people, including free-spending American tourists who brought a welcome flood of U.S. dollars.

The year 1950 proved to be a banner year for Hydro in catching up with power demands. Four new hydro-electric stations were placed in service in eastern and northern Ontario, a fifth was nearing completion, and the Hearn and Keith coal-fired plants were under construction in Toronto and Windsor.





Meanwhile, preliminary work had started on Sir Adam Beck Generating Station No. 2 at Niagara Falls and Hydro was pressing for an early start on the long-discussed St. Lawrence power project.

As well, Hydro was making steady progress in a frequency standardization program launched in 1949 with the support of the municipal utilities to convert from 25-cycle to 60-cycle power. (By 1959, when the largest project of its kind was completed at a cost of \$352 million, 7,000,000 appliances were standardized in the province.)

Despite the massive building program, however, power was still in short supply. The Korean war caused an upsurge in demands and some industrial customers were forced to operate with restricted loads.

Not until 1954, when the Beck No. 2 plant was placed in service and the St. Lawrence project started, was Hydro able to report — for the first time since the 1930's — that all systems had a reasonable power reserve.

Hydro's expansion reflected a continuation during the 1950's, except for the 1958 recession, of strong and sustained economic growth. New industries created more jobs for the growing labor force, while higher wages and a shorter work week contributed to rising living standards.

Meanwhile, marked advances were made in communications and transportation. The CBC began its national TV service in 1952, spinning off new manufacturing and service industries and new demands for electricity. Pipelines were built to funnel Alberta oil and natural gas into Ontario. The St. Lawrence Seaway was opened to deep-draught ships in 1958, air travel expanded rapidly and automobile registrations soared. Toronto's Yonge Street subway opened in 1954.

Computers arrived on the scene and industries introduced more automated equipment to increase production and reduce labor costs. Ontario Hydro installed its first electronic data processing equipment in 1958.

The St. Lawrence development, which generated first power in 1958, represented the last major source of hydro-electric power in southern Ontario and Hydro engineers began placing increasing emphasis on thermal-electric sources based on imported coal and Ontario's uranium.

During the 50's, the coal-fired Richard L. Hearn station on the Toronto waterfront was expanded to 1,200,000 kilowatts. By the end of the decade, work was under way on the 2,400,000-kilowatt Lakeview thermal-electric plant and a 100,000-kilowatt plant at Thunder Bay. The Lakeview plant alone would generate more power than the hydro-electric stations at Niagara Falls.

Hydro-electric development continued in the north. In 1961, Hydro began to build Canada's first extra high voltage (EHV) line, which now carries 560,000 kilowatts at 500,000 volts from James Bay watershed plants to the Toronto area.

The decision to harness the atom for electricity dates back to June, 1953.

During the same year, another chapter in northern Ontario's mining development opened when the world's largest uranium field was discovered in the Blind River-Elliott Lake region, assuring abundant supplies of natural uranium for Canadian reactors.

Sod was turned for the Nuclear Power Demonstration (NPD) plant at Rolphton, Ontario, in 1956 and in 1959 the federal government announced that Atomic Energy of Canada Limited would build Canada's first full-scale nuclear station at Douglas Point. Construction began in 1960.

To meet growing competition from natural gas, particularly for residential water heating, Ontario Hydro and the municipal utilities launched an intensive marketing program in the late 50's, and introduced special rates for electric heating. A large tractor-trailer — reminiscent of Sir Adam Beck's first travelling circus in 1912 — toured the province to demonstrate the advantages of electrical living.

As the 60's began, the Hydro enterprise could look back on 15 years of unprecedented achievement which paralleled and

stimulated Canada's development. Between 1945 and 1960, the gross national product increased from \$11.8 billion to \$38 billion.

For Ontario, it was a period of population growth and rapid transition to a highly-mobile, urban-industrial society. Ontario's farms were increasingly mechanized and demand continued strong for northern mineral and forestry resources.

Indicating the growth of municipal electrical distribution systems, a number of municipalities erected new headquarters and launched programs to place lines underground in suburban and downtown areas.

Electricity's role in the lives of people became pervasive. Monthly average consumption by residential customers served by Hydro municipalities increased in that 15-year period from 200 to 469 kilowatt-hours. Rates, however, remained among the lowest in the world.

But with power demands doubling every 10 to 12 years, Hydro had to duplicate its system virtually every decade.

Two additional coal-burning stations were started in the 60's to produce an additional 6,000,000 kilowatts and plans were announced for a 2,295,000-kilowatt oil-fired plant. Relatively small hydro-electric developments equipped for remote control continued in northern and eastern Ontario.

Steady progress continued in the nuclear power field. The NPD plant started up in 1962 and the Douglas Point station produced first electricity in 1967. Work started on the 2,160,000-kilowatt Pickering generating station in 1965 and three years later plans were announced for the 3,200,000-kilowatt Bruce generating station at Douglas Point.

Through the years, Hydro has expanded the original Niagara system into a 250,000-square-mile operating area which supplies Hydro customers throughout the province.

The final link was forged in 1970 when a 512-mile line was completed to inter-connect Hydro's northwestern Ontario system with the rest of the province. Another 560 miles of line being built to the Manitoba border will enable Hydro to receive power from Manitoba Hydro's Nelson River project in 1972.

Adding strength to Hydro's system, the power network has been linked for mutual benefit since 1962 with an inter-connected systems group which now spans the U.S. and stretches from northern Ontario to the Gulf of Mexico.

Ultimately, Hydro will be a major link in a Canada-wide grid.

Since 1906, Hydro has come a long way in step with provincial growth. This growth is closely intertwined with the economic and social benefits produced by Hydro.

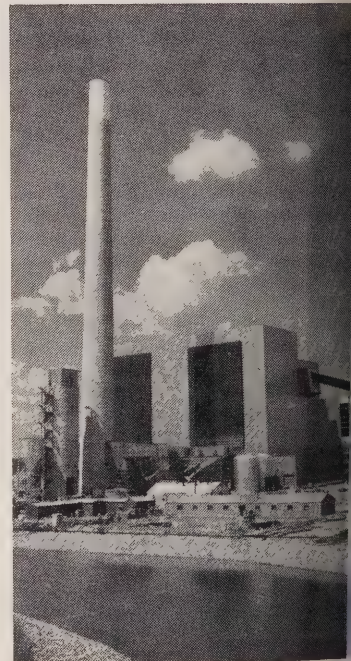
A mainly agricultural "have-not" province with small, scattered industries and a vast undeveloped northland has been transformed into an expanding economy with a broad industrial base. Today, Ontario accounts for 54 per cent of the nation's manufactured goods and about 80 per cent of its fully manufactured exports. About 65 per cent of the electric power supplied by Ontario Hydro is purchased by industry and commerce.

Total goods and services exceed \$35 billion each year; the gross provincial product per capita is exceeded only by the United States and Sweden. Wages and salaries totalled \$18.9 billion in 1970.

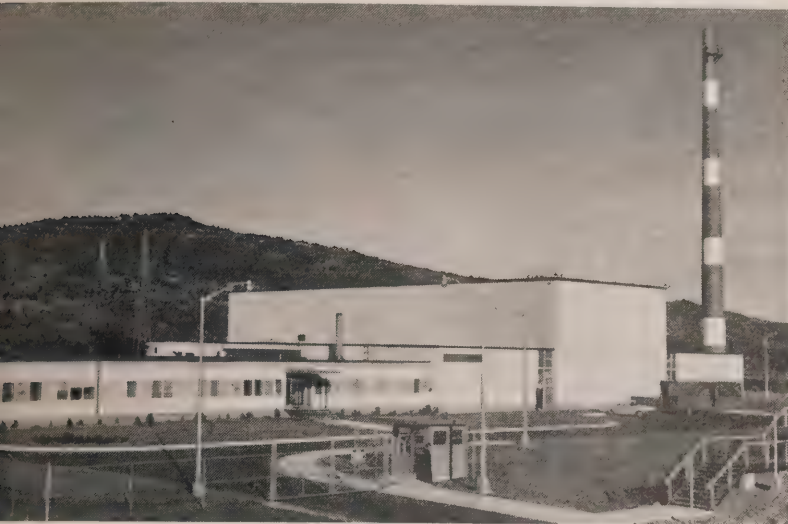
About 7 per cent of Ontario's 3,200,000 workers are engaged in the primary industries — agriculture, forestry, mining and fishing — 34 per cent in manufacturing and 59 per cent in services.

Indicating the importance of electric power, the manufacture of electrical products is one of Ontario's top 10 industries. Factory shipments were an estimated \$1.7 billion in 1969.

Seventy-five per cent of Ontario residents live in cities and towns — twice the percentage in 1900. In fact, 57 per cent live in seven metropolitan areas. The population, now exceeding 7,750,000, has more than doubled in the past 30 years.



lighted terminal at Toronto International Airport
 es the period of post-war affluence and expansion. Among power plants
 meet soaring demands was the 2,400,000-kilowatt Lakeview station,
 t of Metro Toronto. Nuclear Power Demonstration plant at Rolphton (top photo)
 age of nuclear power for Canada.



Although less than 5 per cent of Ontario's labor force is engaged in farming, the average farm is larger and production continues to keep pace with population growth. Farm cash income exceeds \$1.3 billion, compared with \$850 million in 1960.

Despite steady progress, northern Ontario is a still-developing frontier area with great potential. Mining production exceeds the billion-dollar mark annually, while the province's forestry and forest products industry accounts for more than \$715 million.

Tourism has become a \$1.6 billion industry in a province endowed with 250,000 lakes. Ontario residents account for more than a half of this spending annually.

Hydro has grown, too, into a \$4.6 billion publicly-owned enterprise. In 1970, the revenue of the 353 associated municipalities exceeded \$454 million and their assets totalled \$759 million. In addition, they have a combined equity of more than \$520 million in Ontario Hydro, which represents ownership of system facilities.

Between 1945 and 1971, Hydro brought into service 38 new sources of power involving 11 million kilowatts, nearly nine times the dependable capacity in 1945.

But, despite past accomplishments, Hydro has always been a future-oriented organization. Additional capacity planned for completion up to 1978 will total another 11.9 million kilowatts, of which 98 per cent will be thermal-electric.

The 1970's, like every decade in the past, are presenting new challenges to Hydro and the utilities, including increasing costs, environmental concerns and regional government. However, the great strength of the co-operative enterprise has been its ability to adapt to changing conditions and to submerge local concerns for the benefit of the whole province.

Future trends and problems will be examined in the concluding article in this series. □

HO, HO, HO



o, ho. What's all this? The Jolly Green
splashing around in waders at the
f the American Falls? Not so. He's a
er student, strictly life-size, and he's
g dry ice at the base of an Ontario
model to simulate the mist that
ver the Maid of the Mist Pool.

a, ha. We suspected it wasn't the
McCoy. One of the world's natural
ers has been shrunk to one-fiftieth its
l size. It's a faithful reproduction in
ete and compacted sand over a ply-
grid. Even compressed air is injected
e water at the crest to simulate the
l aeration and turbulence. Parts of
ck are painted and artificial bushes,
cars and bridges add to the model's
n.

All that's missing are the honeymoon
couples. But there's little romance at
Ontario Hydro's hydraulic models lab at
Islington where the serious business is
underway of determining what measures,
if any, should be taken to preserve and
enhance the beauty of the waterfall.

With the passing of time, the tremendous
force of rushing water has cut back the
crestline of both the American and the
Horseshoe falls. The erosion is most
evident at the American Falls, where major
rockfalls in 1931 and 1954 caused large
amounts of broken rock or talus to build
up at the base, marring the spectacle of
falling water. Preliminary investigation of
the falls by the U.S. Corps of Engineers
was completed in March, 1967, and led to
the dewatering of the falls in 1969 for
further study.

Construction of the model would have
been virtually impossible without the in-
formation gathered during the dewatering.
The experiments in the hydraulic models
lab, being conducted by the American
Falls International Board, began earlier
this year. A photographic record is being
kept of numerous arrangements of talus,
flow and pool levels. This visual record will
provide guidance in developing and sup-
porting proposals to be made to the
International Joint Commission.

Hee, hee, hee. One problem for the research
team, though. It's a little chilly around
the ankles. □

*Having a quiet chat at the foot of the mini-falls are Col. Ray S. Hansen and
B. E. Russell, joint chairmen of the working committee of the American Falls
International Board. Aerial photo is of the real American Falls.*



July 1965

The large
is feed

Sep

1 pickering

the payoff

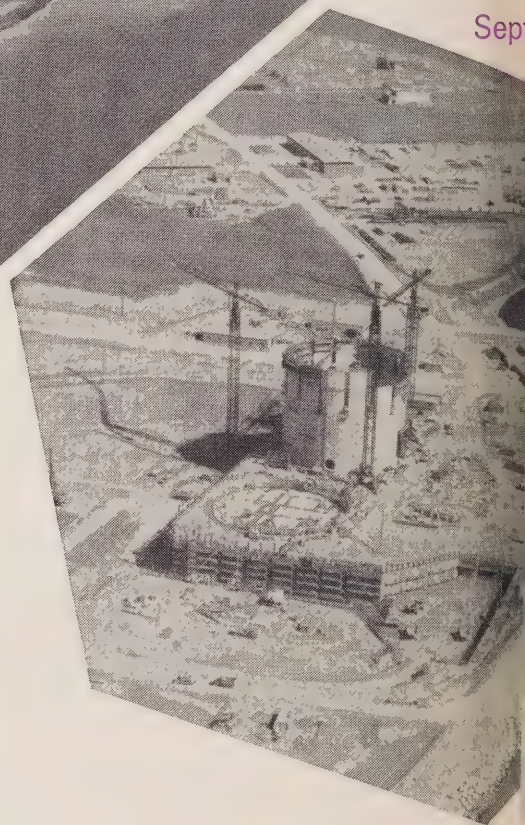
Pickering-1 is performing like a thoroughbred. In the incredibly short time of 94 days since reactor startup, the first 540,000-kilowatt unit at Ontario Hydro's Pickering nuclear power station achieved full power. On July 29, well ahead of expectations, it became an integral part of the power system.

Pickering's commissioning team has every right to feel elated. The largest, most complex unit ever commissioned by Hydro has been made available for steady output. What's more, nuclear technology has taken a long step forward in Canada which, along with other countries, has had its share of setbacks.

Pickering, located on Lake Ontario east of Toronto, was designed by Atomic Energy of Canada Limited and Ontario Hydro. It is the first nuclear station built, owned and operated by a Canadian utility.

"We are very pleased with the results from Pickering," said Hydro Chairman George Gathercole in congratulating the people involved in bringing the station into service. "To pioneer, design and build such a sophisticated power plant requires great talent, sound planning and organization."

Pickering-1's running-in period has been remarkably free of the teething problems

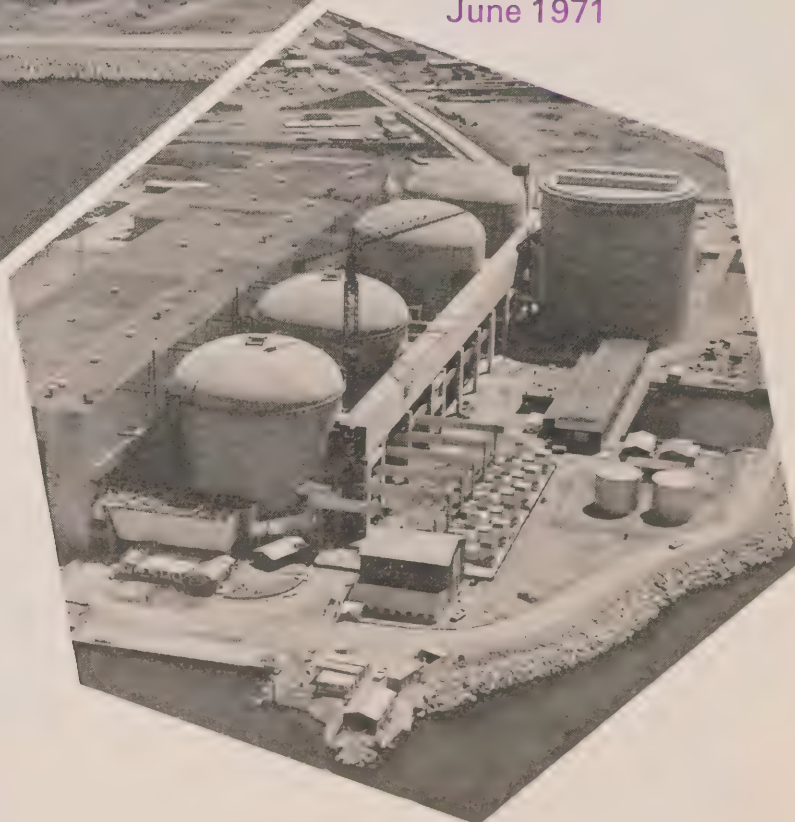


most complex unit ever commissioned by Ontario Hydro
electricity into the provincial grid.

October 1968



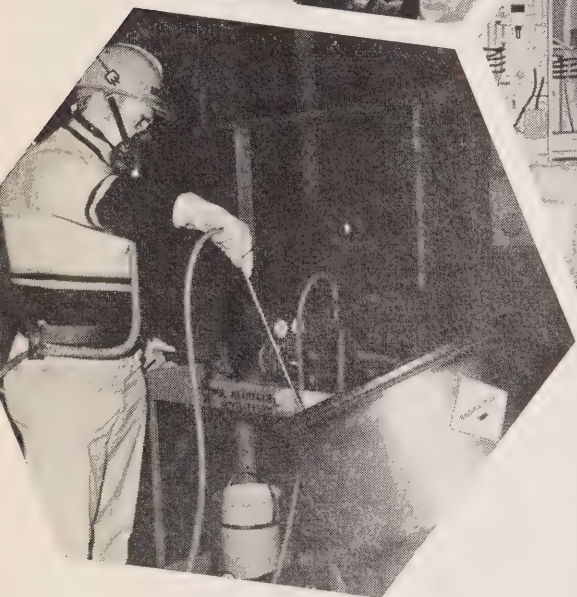
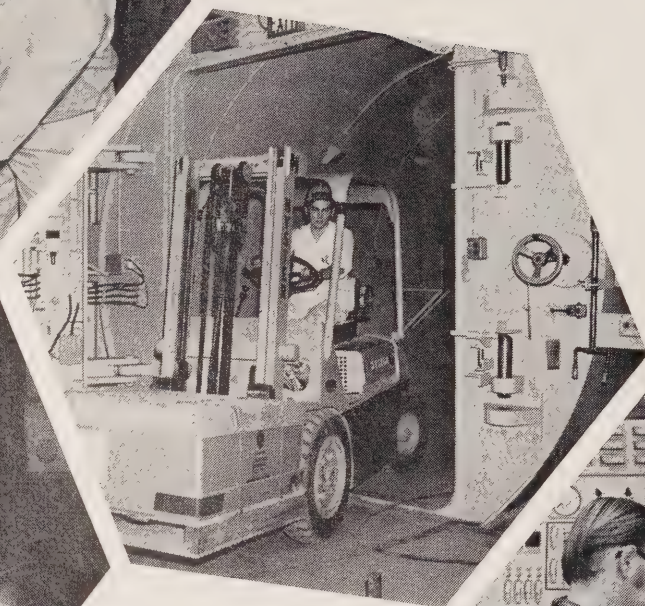
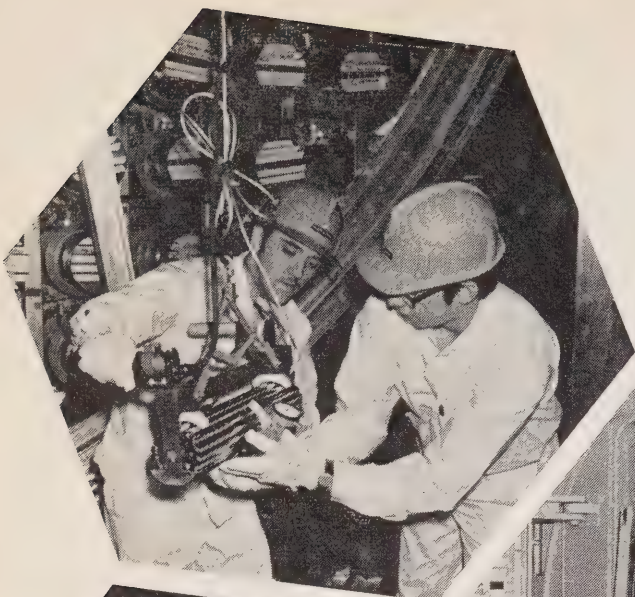
June 1971



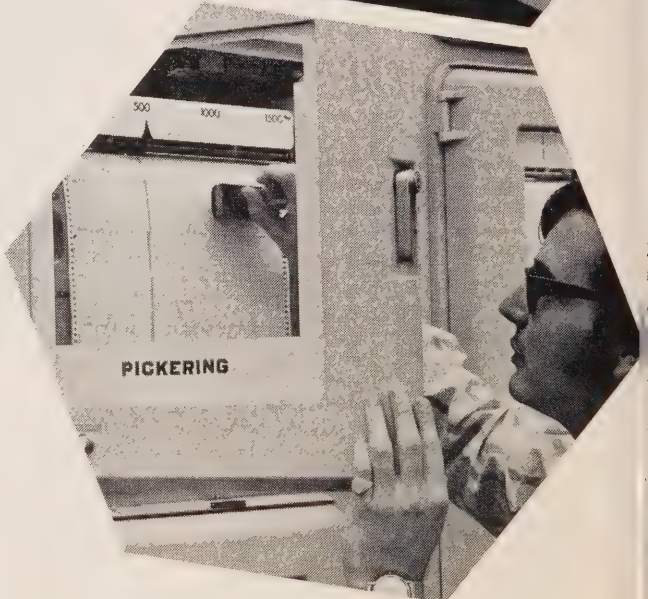
usually plague prototype units, both
nuclear and fossil-fuelled. That doesn't
mean problems won't crop up. Indeed, it
would be surprising if they didn't.

The early Pickering success has given
a welcome fillip to Canada's unique ap-
proach to nuclear power and inspires
growing confidence in our problem-solving
capabilities.

The unit's run-up to full power began
with reactor startup on February 25.
The turbine was spun for the first time
on March 16 and full power was initially
achieved on May 30. Ahead lies an eight-
month shutdown period at full power and



Many painstaking steps occurred before full power from Pickering's first 540,000-kilowatt unit was recorded at Hydro's system control centre, lower right. Other photos show fuelling, heavy water handling, forklift truck passing through reactor building air lock, and control room operator checking computer printout.



several years of operation before the unit can be considered "mature."

Such a brief recital of these steps, however, could be misleading. A nuclear unit is by no means like a production-line car. It's a unique entity, custom-built to do a specific job, and the assembled components require exhaustive checkouts and debugging, individually and collectively. In addition, the overriding consideration in each commissioning step is nuclear safety.

Construction was still proceeding at a merry pace when Hydro's commissioning team began phase A, a lengthy procedure in preparation for reactor startup at Pickering. These steps must be repeated for each of the four 540,000-kilowatt units.

Major steps in phase A include adding heavy water to the heat transport and moderator systems, loading fuel and commissioning reactor auxiliary systems. Phases B and C involve low-power measurements, first output of electricity and a gradual runup to full power.

Then the system needs a "shakedown" period, called phase D, to reach the desired efficiency and level of output which is 80 per cent of the maximum possible kilowatt-hours per year.

Even at the end of this power shakedown, the unit is still considered "immature." Only further debugging, as the engineers call the running-in process, will bring Pickering-1 out of its adolescence.

The painstaking commissioning procedure is similar in many respects to the unsung work involved in bringing a coal-fired unit into service.

But no previous installation in Ontario Hydro's history compares in complexity with the Pickering units. Not only are the main and auxiliary systems more extensive than those in a comparably-sized coal-fired station, but also the regulating and protective systems are more elaborate. There are also triplicated protection and containment systems to ensure that the concentrated energy in the uranium nucleus is safely bottled up.

The last line of defence against accident is the 170-foot-high vacuum building, which operates like a giant safety valve. It's designed to contain all the steam that would be evacuated from a reactor building if a major pipe connection failed — an unlikely occurrence.

Leakage tests in 1970 proved the structural integrity of this building. A water dousing system, which comes on automatically if pressure rises inside the vacuum building, then received full-scale tests.

Next came the filling and operation of the moderator and heat-transport circuits. Although 500 tons of heavy water were on site by mid-1970, natural water was used for initial commissioning of the two systems. This entailed time-consuming steps — draining natural water and drying the systems thoroughly before filling them with heavy water.

Why so finicky about residual water? Heavy water may look, taste, and feel like ordinary water, but it has different nuclear properties. The difference is why Hydro pays up to \$30 a pound for heavy water and dreads having it adulterated with ordinary water.

Other important tests included dumping the moderator (one of the methods of shutting down the reactor), manipulating the shutoff rods, lowering and raising adjuster rods and putting natural water absorbers into service. These operations are all part of the CANDU reactor's protective system.

Once the moderator heavy water was in place in the dump tank located under the reactor vessel, and the circuit judged operational, the loading of fuel began.

The option existed to load the fuel with the help of fuelling machines or to do it manually. To save unnecessary wear and tear on the machines, the 4,680 fuel bundles were loaded by hand and pushed along the 390 channels using an air-operated ram.

Initial reactor startup began by slowly raising the moderator level in the reactor vessel. A series of tests was made at various levels until full power was achieved on May 30.

On-power fuelling will not be attempted until this fall when, for the first time, it will be necessary to refuel or reshuffle fuel bundles in the reactor. Economic operation of a CANDU reactor, however, is not dependent on on-power refuelling. The reactor can be fuelled during a weekend shutdown once a month with a minimal effect on the annual level of output.

Pickering's early success can be traced to a number of factors which are now beginning to pay off. They include a growing fund of operating experience

at two pioneering nuclear stations, significant design changes, vigorous quality control and an intensive staff training program.

The 20,000-kilowatt Nuclear Power Demonstration plant at Rolphton has operated successfully since 1962 and the 200,000-kilowatt Douglas Point station started up in 1967. A number of problems arose, particularly at Douglas Point, but they were shown capable of remedy.

Indeed, it would be difficult to overestimate the contributions Douglas Point has made to Pickering's success. Lessons learned there have been applied to Pickering and to the 3,200,000-kilowatt Bruce generating station now under construction next to Douglas Point.

Douglas Point's main coolant pumps were chosen on the basis of using multiple units of moderate size so extra pumps would be available for standby duty. Experience has shown, however, that the 10 multiple units add to operating problems and contribute to heavy water leakage.

This experience came too late to affect the decision for Pickering, but for the Bruce reactors the largest practical pump was selected. Thus Bruce will have 4 pumps per reactor compared with 16 at Pickering.

A major problem with pumps has been shaft seals, although these units passed extensive shop and laboratory tests. New mechanical seals have been developed and other associated problems have been successfully solved. The resulting improvements have been incorporated into the Pickering and Bruce pumps.

Particular attention has been paid to the problem of heavy water leaks, which occur in the heat transport system where the heavy water is at a pressure of 1,280 pounds per square inch and a temperature of more than 500 degrees. The number of non-welded joints has been sharply reduced to cope with this difficulty.

For example, the approximate number of non-welded joints per reactor at Douglas Point, excluding fuel channel closure seals, is 3,000. This has been reduced to 1,000 at Pickering and 250 at Bruce. The number of packed stem valves has been reduced from 2,000 at Douglas Point to 170 at Pickering and to 75 at Bruce. Bellows sealed valves have also been introduced at Pickering and Bruce to minimize leakage.

Operation of Pickering's first unit illustrates several of the advantages of nuclear-electric power to Ontario Hydro's system.

Because Pickering has lower fuelling costs, the system control centre has been able to reduce generation from higher cost coal-fired units.

During the day, generation has been cut back at the Richard L. Hearn station on the Toronto waterfront and at the Keith plant at Windsor. At night, generation has also been reduced at the more efficient Lakeview and Lambton stations.

These steps result in conservation of imported coal, which costs \$10 a ton, and, particularly in the Toronto area, a reduction in air pollution.

In addition, maintenance crews have gained more flexibility for the annual tune-up of coal-fired units for heavy-duty winter service.

To the end of July, Pickering-1 produced 750,000 megawatt-hours during a total of 1,922 hours in service, achieving up to 97 per cent capacity factor. And during July, Douglas Point operated at 90 per cent capacity factor in producing 167,000 megawatt-hours.

That month, the two nuclear plants supplied over 10 per cent of the total energy generated by all stations across the province. Since startup, their combined output has conserved more than 1,300,000 tons of coal.

To reduce heavy water losses at Douglas Point, the boiler room has been converted to a dry atmosphere with both recirculation and exhaust drying systems. Of the heavy water that escapes as vapor, 95 per cent is recovered.

Pickering contains these provisions in the original design, and a further step at Bruce should substantially eliminate downgrading of heavy water with light water vapor.

By segregating the hot, high-pressure heavy water systems at Bruce from areas where high-pressure light water systems are located, it is expected that heavy water losses at Bruce will be reduced to a very low level.

Quality control adds up to nuclear safety and, ultimately, the high degree of reliability that Hydro wants to achieve. Thus it became a paramount need at Pickering.

Inspection teams worked with suppliers of components long in advance of delivery. On site, too, equipment and installations came in for close scrutiny with radioisotope-powered cameras which searched for flaws. Films were developed at night so corrective action could begin with the morning shift.

When the time came for commissioning and operations, Hydro had a well-trained, experienced staff for Pickering-1. Most

of the staff has graduated from Hydro's Nuclear Training Centre at Rolphoton and won their spurs at both NPD and Douglas Point.

In addition, a tradesman's school was set up to continue training on site and radiation protection courses ensured only qualified people worked in the plant's danger zones.

While Pickering's first unit pumps new energy into the Hydro network, commissioning of Unit 2 is proceeding without major problems. The reactor will be started up this fall and first electricity should be generated before year-end.

Work on Unit 3 is well advanced and many systems have been turned over from construction to operations staff for commissioning. It should be ready for service in 1972. Unit 4 should be ready for startup in 1973.

Pickering's first unit is using 550 tons of heavy water imported by AECL. Unit 2 will use the first production from Canadian General Electric's 400-ton-a-year plant at Point Tupper, N.S., supplemented by foreign purchases.

Some concern exists about the supply of heavy water for the final two units. However, AECL hopes to have sufficient supplies to meet Pickering's needs. It is hoped that Canadian production will

make up the bulk of the needs for Units 3 and 4, but it will still be necessary to rely on imports, and these are not easy to come by.

AECL's Bruce heavy water plant, expected to begin production in 1972, will supply 800 tons annually when in full operation in 1976. All being well, it will meet the full needs of 760 tons for each of the four reactors at the Bruce nuclear station which is scheduled to produce first power in late 1975.

Successful operation of Pickering-1 is a major milestone for Hydro and the nuclear industry, including the 900 firms which are contributing to the project.

Still three years away from completion, the project has so far required more than 14 million man-hours from a construction work force that totalled 3,000 at its peak. There has been one fatal accident since work began in 1965.

The last chapter in the construction story will be written in 1973 when Hydro construction forces turn the final unit over to nuclear operations and tidy up the site for landscaping. As a tourist attraction, Pickering plays host to about 100,000 visitors each year. Eventually, the station will become the focal point in a park setting, part of which has been reclaimed from Lake Ontario. □

UNPLUGGING THE WELLAND

Smoothing out the wrinkles in an eight-mile section of the Welland Canal has spawned a host of secondary problems including the maintenance of power supplies.

by Gerry Gotfrit

In a farming hamlet, 15 miles west of Niagara Falls, stands a fieldstone cairn that is the only memorial to the Father of the Seaway.

On November 30, 1824, William Hamilton Meritt, a slim, granite-faced young business man, stood there at a sod-turning ceremony for the first Welland Canal and told 30 millers, tavern keepers, Irish immigrants and Indians: "We are assembled here this day to connect the greatest extent of inland waters in the whole world. This canal to connect Lake Erie and Lake Ontario is the most important link of communication for we remove the only natural barrier of importance — the Falls of Niagara."

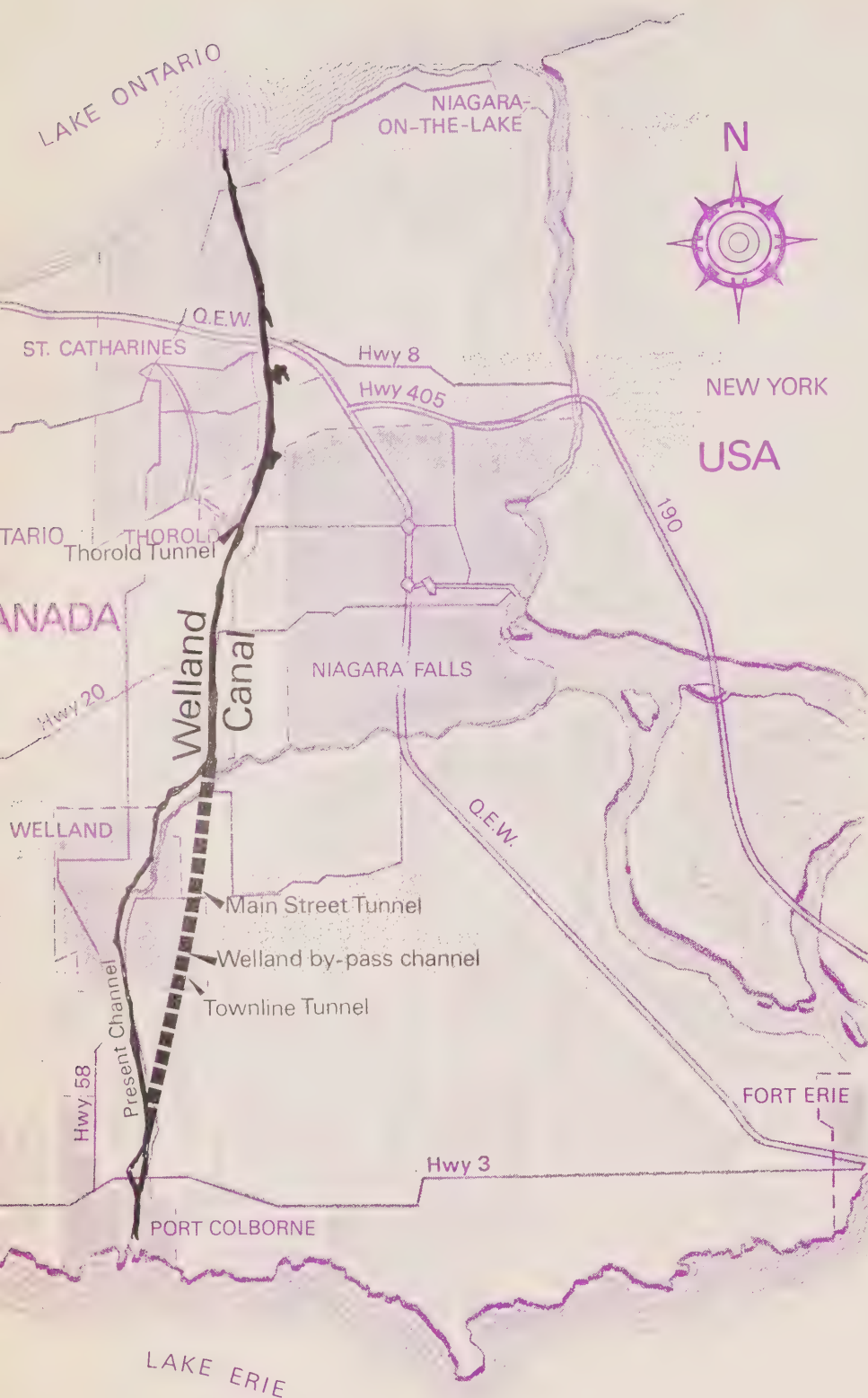
Little did Meritt dream, as his men sweated and cursed through the forests, rocks and swamps of the Niagara peninsula, that the original canal with its leaky wooden locks would be progressively widened and improved until one day giant freighters 730 feet long and 75 feet wide could pass between its walls.

In contrast to the schooners which plied their way from the upper Great Lakes to the Atlantic in the mid-1800's, these 20th-century goliaths would carry 28,000 tons of iron ore or 1,000,000 bushels of wheat at a time.

Indeed, the volume of traffic along the 26-mile waterway has swollen out of all proportion to the capacity of the present canal, completed in 1932. On one occasion last year, more than 50 ships were lined up waiting to enter the canal. With the operating costs of a modern freighter running anywhere from \$2,000 to \$3,000 a day, such delays are obviously unacceptable. But work is underway on an eight-



William Hamilton Meritt



mile channel that by 1973 will by-pass one of the canal's biggest bottlenecks – that narrow, curved section running through the city of Welland itself.

Running east of the city, the by-pass will offer vessels a 350-foot-wide channel, 30 feet deep. The face-lift, being financed by the federal government, is costing \$18 million. That's \$56 million more than the cost of constructing the present canal back in the thirties.

The new section will eliminate six lift-bridges, removing long-time obstacles to rail and road traffic in the Welland area. Replacing them will be two tunnels, one for a four-lane road at East Main Street and the other, at Townline Road near Ontario Hydro's area office, to accommodate a two-lane highway and three railway lines.

Up to 1,400 men have been employed on the project which involves the excavation of 45 million cubic yards of earth for the channel cut – enough to cover a city block two miles high – plus an additional 20 million yards for the tunnels, a diversion of the Welland River and new docks. Excavated earth is being graded to form windbreak for vessels and enhance the appearance of the area.

Roads, railway lines, gas mains, telephones and power lines all have to be moved. Fortunately, the new channel isolates only a small wedge of the city's eastern boundary, keeping such disruptions to a minimum.

But construction does bring its problems. Welland Hydro manager Reg Turton says the Seaway Authority has bought and removed all electrical distribution equipment in the affected area, selling reusable items back to the utility.

"In all, the equipment is worth about \$32,000," says Mr. Turton. "There's no sense buying it all back because changing technology has rendered some of it obsolete. Fortunately, this is not an area with great load density. I suppose that's one reason the Seaway could go ahead with this particular route."

About 60 residential customers of Welland Hydro lived in the path of the new waterway and had to be relocated, while an alternative route had to be found to supply power to two industrial plants isolated from the city by the channel.

Ontario Hydro services in the area were also disrupted and Welland area manager Lorne Corlett has been kept busy directing his staff to see the project through to a successful conclusion as well as providing normal service to the area's 10,000 rural customers.

Low tension and distribution lines will be routed through the tunnels and through

The Welland Canal is a vital link in the Seaway system and a new section under construction will by-pass the city of Welland itself. In so doing, it will eliminate six lift-bridges and end traffic snarls.



ducts under the canal. High-tension circuits are being strung across the canal from towers up to 329 feet tall.

Crews also moved two miles of line sideways 48 feet — a major undertaking accomplished without even interrupting the supply of power. And five miles of new line were installed to service 90 homes relocated on one side of the canal.

Construction of the present Welland canal was one of the great engineering feats of the first half of the century. It was first started in 1913, but was interrupted by World War I and didn't really get going until 1919. Along its 26½-mile length are eight locks which enable vessels to surmount the 326-foot difference in levels between Lake Ontario and Lake Erie.

"It is a privilege to dedicate this canal to the trade of the world. I hereby declare the Welland Canal open to the commerce of the world." Those were the words of the Governor General of Canada, the Earl of Bessborough, as he officially opened the waterway in 1932.

Into the lock chamber eased the S.S. Lamoyne, then the largest freighter on the Great Lakes. Hundreds of colored flags were strung from her masts and her holds were filled with 530,000 bushels of wheat.

Ironic as it may seem, 36 years later the Lamoyne struck Welland's Main Street lift-bridge after a collision with another vessel, closing down seaway navigation for a day.

Iron ore and wheat constitute the most important cargoes carried through the canal, although it handles substantial

quantities of coal, too. Last year, Ontario Hydro imported over five-and-a-half million tons of American coal, shipped from the port of Conneaut, Ohio, through the Welland Canal to the Hearn and Lakeview generating stations in Toronto.

Unhappily, the Seaway Authority faces the dilemma of having to improve the canal to speed up shipping while facing a decline in revenue due to the growth of road and rail container traffic, the use of super-sized and, therefore, fewer vessels and, with the introduction of unit trains, lower railway freight rates.

To help pay its way, the Seaway Authority has steadily increased its lockage fees on the Welland. Ontario Hydro paid \$228,000 in toll charges last year, and tolls will add \$300,000 to coal costs in 1971. Dr. Pierre Camu, president of the Seaway Authority, has commented that "the worsening debt is of great concern to the Authority, and we have to come up with a solution."

Already, plans for twinning all eight locks have been changed because of second thoughts about the growth of traffic. Three of the locks are twinned, but improved ship traffic control methods have made further twinning unnecessary until at least the year 2000.

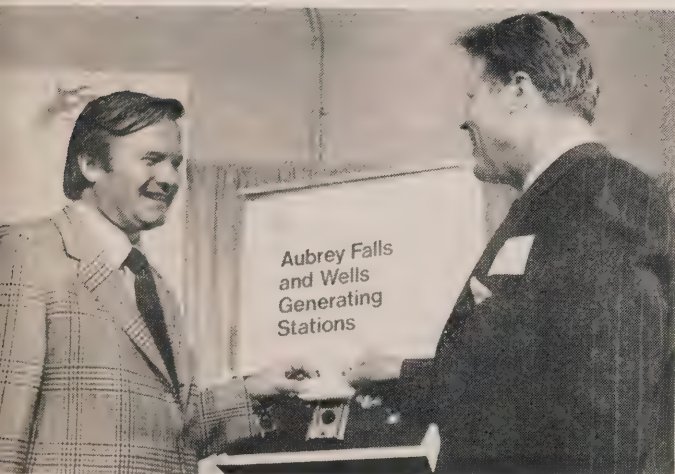
However, the removal of the bottleneck at Welland will be welcomed on all sides. It will be welcomed by worried shipowners, fretting about their tied-up vessels. It will be welcomed by customers, waiting for their goods. Most of all, perhaps, it will be welcomed by the citizens of Welland, who can see an end to those frustrating traffic jams waiting for the ships to pass by. □

Huge lake freighters are just able to squeeze through the Welland Canal's eight locks.



long hydro lines

Premier opens northern plants



A plaque is dedicated to the men whose hands and skills built hydro-electric power stations of the Mississagi," says the caption on a bronze plaque unveiled recently by Prime Minister James Earl Davis at the opening of the Wells and Aubrey Falls generating stations.

With an assist from Ontario Hydro Chairman George Gathercole, Davis is shown pressing a button to officially start the twin generators at the Wells plant, 20 miles northeast of Thessalon.

Aubrey Falls, further upstream, came on line in 1969. Together with the Lower Notch generating station, nearing completion on the French River, the stations are part of an expansion plan to meet power needs in Northern Ontario. The three plants represent an investment of \$133 million and provide a total capacity of 1,450 kilowatts.

From its watershed in the Algoma district to where it empties into Lake Huron, near Blind River, the 138-mile-long Mississagi flows 945 feet through remote lakes, rapids and waterfalls. Ontario Hydro has tapped its power potential at four points. The first Mississagi plants are the George W. Rayner station and the Rock Falls plant. Wells generating station shares a headpond with the Rayner installation. □

Task force invites suggestions

Task Force Hydro, the body established by the Committee on Government Productivity to study all facets of the Hydro operation in Ontario, has called for submissions from individuals or

groups with information or suggestions to offer about the administration or efficiency of Ontario Hydro.

Copies of a six-page brochure outlining the Task Force's objectives and asking for submissions have been sent to all municipal electric utility commissioners and managers throughout Ontario. In addition, advertisements were being run this month in daily newspapers across the province seeking submissions from the general public.

The task force has already begun the huge job of studying Hydro's function, structure, operation, financing and objectives. While the assessment has been earmarked to last a year, implementation of some recommendations is expected to take place as the study proceeds rather than wait until the report is complete.

Guided by a five-man steering committee under the chairmanship of J. Dean Muncaster, president of Canadian Tire Corporation, the Task Force will be assessing Hydro's management and planning from four vantage points:

- In the light of past studies, their recommendations and the degree of success achieved in implementation.
- By information drawn from a series of interviews with Ontario Hydro employees.
- Through specific studies undertaken by Task Force Hydro project teams.
- Through the eyes of private citizens and special interest groups who are invited to submit their observations, opinions and suggestions.

Other members of the steering committee include H. A. Crothers, president of Crothers Ltd., R. B. Taylor, vice-president and treasurer of the Steel Company of Canada Ltd., OMEA president Andrew Frame and Ontario Hydro's general manager, D. J. Gordon. R. M. Dillon, Western University's dean of engineering, has been granted leave-of-absence to act as the task force's executive director and ex-officio member of the steering committee.

A number of liaison officers have been appointed to assist the task force from various branches of Ontario Hydro. They also include the managers of the Association of Municipal Electrical Utilities and the Ontario Municipal Electric Association.

The OMEA plans to make a submission to the task force and it's expected that some individual utilities will make their own submissions.

Ontario Hydro Chairman George Gathercole has welcomed the formation of Task Force Hydro. At the time of the original announcement, he said: "Hydro has an outstanding organization, but we face a difficult period of expansion in a time of rapid change. Inflationary pressures, environmental concerns and problems that are inevitably associated with introducing new technology and prototype equipment represent a formidable challenge to the Commission. A detached — and objective — view of the Commission's activities will be helpful." □

Energy probe

Queen's University principal Dr. John Deutsch has been appointed to head an advisory committee that will draw up a long-range energy policy for the Ontario government.

The committee will include representatives from the oil, natural gas, coal and uranium industries, electrical consumer groups, members of the federal Department of Energy, Mines and Resources as well as provincial civil servants from the departments of Treasury and Economics, Mines and Northern Affairs, Environment and the Attorney-General.

In an announcement, Prime Minister William Davis emphasized the committee's purpose is not to investigate Ontario Hydro. "That investigation is being carried out by an inter-departmental committee of senior civil servants. The work of the two committees will be co-ordinated," the prime minister said.

Mr. Davis said Ontario is able to supply only 10 per cent of its own energy needs. "We are a heavy importer of energy sources and will likely always be in this position," he added.

The committee will also be asked to look into environmental pollution as well as assuring the availability of adequate low-cost energy supplies to support sustained economic growth. □

Joke on the joker



The good ship Air Flow

A practical joke proved the key to unlocking a fuel-handling problem for laboratory technicians at Atomic Energy of Canada Limited's power projects laboratories.

Someone placed a toy sailboat in a tank of water technicians were using to simulate the fuel shuffling bay at Hydro-Quebec's Gentilly nuclear power station. But the little craft proved effective in helping the technicians to determine the air flow in the bay.

After being removed from the fuelling machine, fuel strings are transported under water on conveyors to the shuffling bay. The water acts as a shield against radiation. Spent bundles are removed and new ones added to the string by remote control.

As a damaged bundle might result in radioactive gases being released, a closely-controlled ventilation system is essential. Smoke bombs were used mainly to determine a proper air flow pattern, but in some of the experiments the little boat, dubbed "Air Flow the First," was used to advantage. □

Combatting cancer

Atomic Energy of Canada Limited's commercial products division, the University of Western Ontario and the Ontario Cancer Treatment and Research Foundation have pooled resources to participate in a research program.

Collaboration is underway to design, build and clinically evaluate a range of accelerators—electronic devices which produce high-energy beams of radiation that can be used in the treatment of cancer. The accelerators will complement AECL's present line of Cobalt-60 cancer therapy machines, which were developed in Canada in 1951 and are in use today throughout the world.

The program involves studies on two types of accelerator. The first, a linear model, will be designed and constructed at AECL's Chalk River Nuclear Laboratories and the prototype installed in the London clinic of the Ontario Cancer Treatment and Research Foundation for evaluation.

The program's second stage, incorporating Western University's facilities, involves the design and construction of a "racetrack" microtron accelerator capable of producing intense beams of X-rays and electrons. Western's physics department, with 12

years' research on the racetrack model, is considered a leader in the field.

The racetrack microtron, like the linear accelerator, employs power at microwave frequencies to accelerate electrons to a high velocity. In the linear accelerator, electrons pass but once through the accelerating cavity in order to attain high energies. In the racetrack microtron, electrons pass through the same accelerating cavity several times, gaining energy with each transit. The racetrack version, too, will be tested and evaluated in the London clinic.

Doom prophets criticized

Statements that air pollution endangers health and could eventually endanger survival "do not seem to recognize the facts," says Ian Butters, of the Economic Council of Canada.

He adds: "All available evidence indicates a general decline in sulphur dioxide pollution in the past 30 or 40 years and in so many cities it stands at only a third of its pre-Second World War level."

"The prophets of doom, some of whom go as far as putting human life expectancy at only three decades, did not take account of the reduction in pollution from pre-war coal-burning factories, locomotives and houses," Mr. Butters told a University of Toronto audience at a conference on the role of universities in environmental studies.

"The nub of the matter is that a recent US Bureau of Standards study has been overlooked. It concluded that over the past 20 years, the oxygen content of the earth's atmosphere has remained virtually unchanged."

While he pointed out that he was not stating an official Economic Council position, he said that many people were becoming increasingly aware of the very real danger of a downturn in production and a subsequent loss of jobs because of "incessant strenuous demands that industry eliminate all forms of pollution immediately, regardless of the cost."

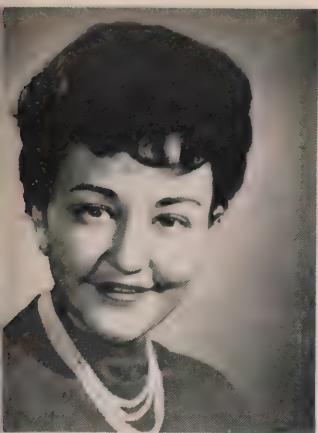
Symbol of longevity



Campus plant-in

Dr. Richard L. Hearn, former Ontario Hydro chairman and chancellor of Brock University, took a silver spade in hand and put the finishing touches to a tree planted on the university campus. Dr. Charles Sankey, present chancellor, looking on, he had picked the red oak because it symbolized longevity, perseverance, virtues shared by Dr. Hearn.

Earlier in the day, Education Minister Robert Welch paid tribute to Dr. Hearn on behalf of the Ontario government. "As this tree takes root," he said, "so does this university in the community." Dr. Hearn retires from Brock's board of governors at the end of the year, ending 58 years in public life.



Bruce



Anahareo

another facet to the fascinating and extraordinary personality Grey Owl, the Englishman turned Indian, trapper turned conservationist, came to light recently in a conversation with one of his daughters, Shirley Dawn Grey Owl, otherwise known as Mrs. Arthur Bruce.

Mrs. Bruce was in Toronto to see prospective publishers about an autobiography written by her mother, Anahareo, who was married to Grey Owl for 11 years (see February Hydro News). Anahareo, who is 65, now lives in the small community of Bulkleyville, 76 miles from Kamloops, B.C.

Mrs. Bruce, who has been on a personal crusade on behalf of her father for the past 20 years, says: "Grey Owl has too often been misjudged due to sensational journalism which deals only with his personal life and too little with his work as a conservationist and the quality and beauty of his writings.

He was no doubt a wild greenhorn kid, but he was just one of a bunch in a time when there were not so many who conducted themselves differently. My father was first and foremost a conservationist, promoting the sort of ideas in the 1930's that we have in today — he was 40 years ahead of his time. He was the first naturalist hired by the National Parks and he was largely responsible for the introduction of laws prohibiting trapping at certain times of the year."

Grey Owl was working as a trapper and guide when he first met Anahareo and they were married by an Indian chief at Simon Lake, Quebec. For a time, the two gained their livelihood by trapping. After seeing a lynx caught in a steel trap, Anahareo stopped trapping. Grey Owl, too, finally gave up the trapline.

Mrs. Bruce said: "His work is full of apologies for the cruelties perpetrated on animals. There were many hard times for my father and him, after my father quit trapping, but even near-starvation couldn't drive him back to trapping again."

Best sellers

Grey Owl and Anahareo took it upon themselves to prevent the extermination of beaver and eventually settled down at Ajawaan Lake in the Prince Albert National Park in Saskatchewan. The cabin at Ajawaan was named Beaver Lodge and it was there that Grey Owl spent his most productive years. Two of the four books he wrote were best-sellers at the same time, and his books have been translated into 13 languages.

Mrs. Bruce has a few vivid recollections of her father, although faded when she was a little over five years old. She can recall Jelly Roll, the beaver whom Grey Owl refers to as "the Boss" or "the Queen" in his writings, the beaver house that Jelly Roll and Grey Owl built right in the cabin, squirrels that sat on the window-sills, whiskey-jacks that would swoop down and steal bacon from the frying pan and a moose called Charlie.

"One of my earliest impressions of my father is the smell of his buckskins. And to me he seemed to be the tallest man in the world (he topped 6 ft. 1 in.). Above all, I can remember his gentleness. My mother admired him greatly and still does. When they eventually parted, it was by mutual agreement."

Grey Owl's first book, "Men of the Last Frontier," was started shortly after they met and "Pilgrims of the Wild" was based specifically on the wanderings of Anahareo and himself. It is still selling well.

Mrs. Bruce says Grey Owl's lectures were always filled to capacity. "People listened to him because he was a romantic figure on stage, he wove engaging tales and he was bringing to many a little of a land they had only read about. He would say, 'You are tired of years of civilization, and I come and offer you what — a single green leaf.' His emphasis was fair play, not all living things have our advantages, and he maintained that kindness was never lost.

"My father did a number of people an awful lot of good," she says. "He gave kindness to just ordinary people, for instance the carrying of a gramophone and records 17 miles to a friend's sick mother, and then sitting the whole day with her to listen to music they both enjoyed. It sounds corny, I suppose, and because of that the story was poor copy.

"Fame took its toll. When my father returned from his last lecture tour, he was ill. The obligations of a famous personality were probably taking away the freedom he had left England to obtain. I wonder if he would think it all worthwhile if he could read what has been printed since his death?" □

Where it's at



A weighty problem

The natural concentration of deuterium is important in the siting of heavy water production plants and a team of experts from Atomic Energy of Canada Limited's Chalk River Nuclear Laboratories has just completed a two-year study on the deuterium content of Canadian waters.

Using a mass spectrometer at CRNL, the deuterium content of water from about 100 sites across the nation was measured as a part of the study. The instrument, pictured above, detects the heavy hydrogen isotope to a precision of plus or minus two parts per million.

Results of the study showed that the natural concentration of deuterium in surface waters ranges from 155 parts per million in coastal seawater to 130 at northern inland freshwater sites. The lower Great Lakes and streams draining coastal areas have the highest deuterium content of freshwater in Canada.

The efficiency of heavy water plants is directly proportional to the deuterium content of the water. □

A day to remember



Trip to the Falls

It was a memorable day for the OMEA-AMEU public relations co-ordinating committee. The group, shown outside the Hydro Hall of Memory in Niagara Falls, visited the Beck power plants, lunched at the Skylon and then journeyed to Nanticoke generating station for a tour of the site before joining members of OMEA District 5 at their summer meeting.

Left to right are F. T. Julian, commissioner, Woodstock PUC; W. J. Jackson, manager, Ontario Hydro's Niagara Region; J. F. Rousom, manager, Woodstock PUC; A. L. Furanna, president of the AMEU, London PUC; H. C. Fuller, manager, Watford PUC; H. S. MacDonald, plant superintendent, Beck generating station; E. C. Nokes, secretary-manager of the OMEA; T. J. Curtis, general manager, Scarborough PUC; H. E. Brownhill, general manager, Niagara Falls Hydro; R. G. Bishop, manager, Meaford PUC; M. E. Bradden, Ontario Hydro, and W. J. Killough, recording secretary of the committee. □

Museums administrator

A member of Ontario Hydro's public relations division, T. E. Dietrich, has been named Hydro's museums administrator. In his new position, Mr. Dietrich will administer the work associated with the collecting, refurbishing and display of historical electrical artifacts.

In addition, he will be responsible for long-range planning related to the Hydro Hall of Memory at Niagara Falls. The Hall of Memory will continue to be run by Hydro's Niagara Region staff. During his career with Hydro, Mr. Dietrich has held a number of senior public relations positions and was mainly responsible for the establishment of the museum concept several years ago. □

Oakville goes underground

The first phase of a \$3 million program to convert Oakville PUC's overhead distribution system to an underground network in the city's downtown area will begin this year.

The underground system will completely replace unsightly poles and wires in the city's core area within 10 years.

Manager Ross Lamb says the new system may involve a three-fold increase in the present voltage. The higher voltage would be the first step toward standardizing electrical service, resulting in reduced costs to both the utility and its customers. □

Options exercised

Ontario Hydro has exercised options on 700 acres of land in Darlington Township, two miles west of Bowmanville, for the construction of a power station "sometime in the future."

Discussions with planning agencies and tests at the site

indicate it is suitable for construction of a power station. Darlington Township council has given approval in principle to the proposed plant. In addition, Hydro has received approval of plans from provincial and district planning agencies.

municipal briefs

Toronto Hydro lists as "the most significant and interesting feature" in its 60 years of growth the fact that the average revenue from the sale of energy in the city of Toronto has decreased from 2.01 cents in 1912 to 1.18 cents a kilowatt-hour in 1970.

Ontario Hydro has named Alex Grant and W. A. Whitehead as senior labor relations officers in its municipal labor relations department. Mr. Grant has been with the department since 1968. Mr. Whitehead was personnel officer for the nuclear operations division prior to his appointment.

Lindsay Hydro crews are reportedly busy posting "post no bills" signs on the utility's poles in compliance with a town by-law outlawing signs on Hydro poles. The nails left behind when posters are removed, says manager Jack Lightbody, can be extremely dangerous.

Trenton PUC commissioners are breathing a collective sigh of relief. Their long search for a reasonably-priced substation site appears to have come to an end. The site selected is part of a 15-acre parcel owned by Marathon Realty, a CP Rail subsidiary. The railway wanted to sell the land for \$75,000, but negotiations have led to an agreement to sell a piece for \$5,600, which was the PUC's budget figure.

Stratford PUC has announced a rate increase of "about 10 per cent" to its residential and general service electrical customers. The new rates will be reflected on bills issued on and after September 1.

Half of Listowel was in the dark recently and vandals were to blame. Six insulators on the line feeding the town were shattered by .22 rifle bullets.

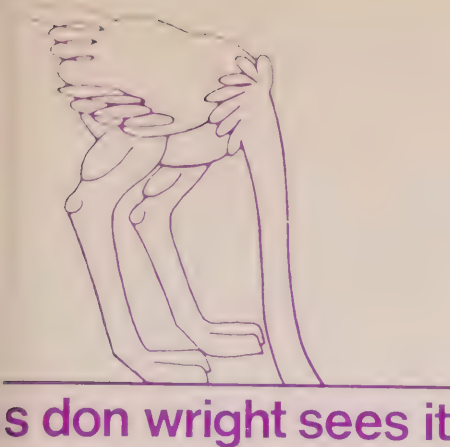
Toronto Hydro is expanding its facilities to keep abreast of the construction boom. According to the utility's diamond jubilee annual report, peak load reached a high of 900,689 kilowatts, an increase of 47,972 kilowatts, or 5.63 per cent over the 1969 peak. By the end of next year, it's expected the load will exceed 1,000,000 kilowatts.

John Thomas Cookson has joined the ranks of Ontario Hydro's 25-year club. Mr. Cookson is a municipal accountant working out of Hydro's Northeastern Region office at North Bay.

Gananoque Town Council has approved a 4.5 per cent rate increase proposed by the Gananoque Electric Light and Power Supply Company. The company, which has been supplying power to the town since 1866, said it was compelled to raise rates "due to the rising costs in wages, taxes, supplies, materials and equipment."

In a rather novel way, Cobourg PUC has announced a rate increase for electrical service. In a three-column advertisement in the local newspaper, the utility suggested "the story is the same in Cobourg as it is all over the province — there is just not sufficient money to run the utility. We could, at this point, tell you about the increased cost of power, increased cost of material, increased cost of labor — but you have all heard the story many times before. The plain truth of the matter is Cobourg Public Utilities is caught in the same cost spiral as everyone else and at this time must increase Hydro rates."

A member of Welland Hydro since 1956, H. W. Walker resigned his seat due to poor health. Mr. Walker first served on the commission in 1946-47 in his capacity as mayor and was elected a commissioner in 1956. He is a former MPP for Welland.



Don Wright sees it

terature takes myriad forms and each has students and advocates. Highbrows and to favor the essay and the sonnet. Middlebrows relish the play and the novel. Lowbrows are content with this column and ditties like the one about the man named Dave who kept a dead Moor in a cave. For our part, we dig the office memo. In spite of its humble beginning as a simple means of conveying a thought or a decision, the memo has reached a stage where it need do neither. A true virtuoso of the art can leave the recipient nodding vaguely over the depth and sagacity of the contents but secretly fearful that he's too one-headed to grasp the significance.

The truth is, of course, that the thing has no meaning whatsoever, but this can be hidden entirely with the judicious use of high-sounding phrases peppered adroitly with vague but fashionable terminology culled from past memos and from correspondence retained for the purpose from assistant general managers and above.

This is not to suggest that anyone can learn to compose the memo in its highest form through practice and training. All truly great memos are written in full seriousness and usually by those with no sense of humor and a paucity of ability in any other direction. Suppose, for example, you received the following correspondence:

"As you may or may not be aware, I have been charged with the responsibility of establishing our 'people dimension' or general posture relative to the functional feedback as interpreted by the various media, print or otherwise, of which this organization is an integral entity.

I want to make it crystal clear, of course, that our response will be positive and forward-leaning as well as mission-oriented and consistent with the high ideals embodied in the socio-economic and physical climate of this organization. Its upward thrust impinges upon the

environment with which we are, I feel sure, justly proud.

"Let's discuss this further at your convenience, in the interest of cross-fertilization."

The serious student will immediately recognize that this is the work of a young man who may or may not attain the epitome of turbidity which sets the master aside. The last sentence negates much of the good work achieved in the preceding paragraphs and will sicken the connoisseur with its clarity and directness.

Too, the purpose of the memo isn't sufficiently veiled. It's an obvious appeal by a man who hasn't the slightest idea what he's supposed to be doing for a meeting of his peers in the hope that they will do it for him.

While recognition of the office memo as an art form may have been late in forthcoming, many practitioners have long been reaping handsome rewards in the form of steady employment. These are the fellows who saw that a good memo could be an end in itself and need not necessarily be followed up by work or action of any kind. Their works will be found gathering dust in "bring forward later" files in corporation after corporation where, except for furtive and periodic shuffling, they will remain forever dormant.

How can you fire a man who has consistently "gone to paper" simply because you're too dense to understand his memos?

Electricity and the spirit world are seldom connected, but some high-voltage shenanigans from Denmark suggest that gremlins do, occasionally, invade the kilowatt supply. A sawmill operator in a small village near Copenhagen has been forced out of business by mysterious electrical forces which have blown out fuses by the thousands, bulbs by the hundreds and motors by the dozen.

The mystery has defied the efforts of the electrical supply utility, a university professor and the makers of the motors and other installations in the mill. Nor can the unfortunate operator escape in the sanctity of his nearby home. Enormous surges of excess voltage have started four fires in his house and power experts measured 29,000 "lightning-like" electrical discharges in the mill in a single day.

Something is weird in the State of Denmark, all right, and until someone comes up with a better explanation, we'll have to go along with the professor who investigated the phenomenon — "supernatural forces or pixies appear to be at play."

What with pollution, inflation and the high cost of doing business, poltergeists in the power supply we can do without. As Pierre Shakespeare might have put it:

Double, double, toil and trouble,
Power pixies — fuddle duddle.

Biologists in the audience, and we're sure there is one because every two or three decades we get a letter explaining how the ostrich at the top of this page is really a double-tufted titmouse, will be aware of the new interest the neurotoxins are arousing among researchers for their highly selective actions on the human nervous system. We refer, of course, to the likes of tetrodotoxin, batrachotoxin and bungarotoxin. For the sake of the ignorant, these substances are, in the order named, puffer-fish poison, frog secretion and snake venom.

No wonder the suspicion persists that our neurobiologists are still diddling with magic and witchcraft. Exotic compounds like these will put our erudite readers (we have one or more of these) in mind of the three sexy sisters and the soup-making scene in *Macbeth*.

Round about the caldron go,
In the poison'd entrails throw
... Eye of newt, and toe of frog,
Wool of bat, and tongue of dog.

Long accustomed to tightening their belts in the face of economic adversity, Britishers are now exporting them — chastity belts, that is. Associated Press reports that these medieval security devices are among the country's fastest growing exports.

Taking their reputation for skilled craftsmanship into consideration, it's not surprising that England should corner the market on an item where dependability is a requisite. What does intrigue us about the report is a bit about taxes.

"Ever since the Government took off the 11 per cent sales tax we have been inundated with orders from all over the world," observed a spokesman for the firm manufacturing the belts. Doesn't it seem odd that a decision to protect or not to protect a lady's virtue could be influenced by a sales tax — \$1.29 to be exact?

If women's lib suffered a setback with regard to the above, it took a large leap forward here in Ontario. The Law Reform Commission has recommended that professional women wrestlers be allowed, in the future, to wrestle "to a decision." Until now they have been permitted only "demonstrations."

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ontario hydro news

october 1971

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the cover

Canada's nuclear reactors require large quantities of heavy water both to moderate the fission process and transport heat to the station's steam generators (see article on page 4). Here, scientists at Atomic Energy of Canada Ltd. are seen conducting research into more economical ways of producing heavy water.

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Some thoughts on PR

Even though it's been with us for several decades, public relations as a corporate function is often misunderstood.

The reasons are probably rooted in the unprincipled past when the glib-talking man in the grey flannel suit was only expected to produce enough snow to snuff out the fires ignited among the public by callous and ill-conceived corporate policies and actions.

Maturity may have been slow in coming to the profession and subtly manifested, but the change has been significant. The back-slap and the snow job no more denote the modern PR man than do the green eye shade and sleeve garters typify today's newspaper editor.

This is not to suggest that the metamorphosis has been complete. Tradition dies hard and there is still a propensity in some corporate board rooms to regard the PR function as essentially negative — a useful tool in helping to gloss over errors and short-sightedness in planning and procedures as they impinge on the community at large.

And there remains more than a smattering of reactionaries among PR practitioners themselves who persist in the belief that their job is to propagandize. They continue to fill the editor's waste basket with company pap and cling to the outmoded belief that the news media can be managed and controlled.

Thinking is hard work and it is always easier to react to specific situations after they have developed than to plan and formulate programs which are likely to prevent or ameliorate problems as they may be expected to arise in the future. Keeping in tune with changing values is a big part of the challenge.

By and large, though, the profession has come of age and the new maturity promises that its role in the future will be rewarding to its practitioners and constructive to society.

PR specialists have come to appreciate the need for bringing the views and aspirations of the more thoughtful elements of society into the establishment of long-term corporate goals. They see themselves helping to search out and develop the deeper values inherent in the company-community relationship and assisting in achieving a compatibility which is essential to the progress and welfare of both.

Idealism and sincerity as opposed to glibness and opportunism are finding their place in PR thinking just as they must throughout the business establishment. There is a growing recognition of the need for spiritual and moral standards which can stand up to logic and open-handedness.

In this latter respect, it is not realistic to suppose that any corporation or individual can achieve universal sanction. The longing to be liked by all is as illogical as it is prevalent. Understanding and approval by the responsible majority is the more practical objective of the evolving corporate and PR philosophy.

The PR function still tends to be regarded by the public in its narrower concept and its practitioners as professional communicators. So they are, of course, but this role is becoming subordinate to the responsibility for thinking, planning and educating.

Skilful writing, production and graphic packaging remain vital as what is being said must be read or looked at or listened to. But it's the integrity of the message that counts. In this age of social awareness, the need is to ensure that the corporate story stands up to close public scrutiny.

Society is the sum of its parts and each facet has a common interest in the well-being of the whole — business and the public included. [



where to get a gander at the giant Canada goose

Jerome J. Knap

No group of birds arouses the imagination of man as much as waterfowl. This probably is a vestige of ancient times when man was a hunter and waterfowl meant food. Even those whose senses have long been blunted by city and civilization will instinctively look skyward when they hear the honking of wild geese.

The welfare of waterfowl has been of concern to many men, from the great khans of Cathay to modern businessmen. This concern shows itself in many ways. The Ontario Waterfowl Research Foundation, formed in 1961 by a group of businessmen under the chairmanship of W. C. Harris, a Toronto investment dealer, is one such manifestation.

Pride of the foundation, which is a non-profit organization, is the Kortright Waterfowl Park, part of a 100-acre wildlife sanctuary on the outskirts of Guelph. William H. Carrick, a noted wildlife photographer and naturalist, is its manager. The sanctuary incorporates both a research station and a public waterfowl park.

The Niska Waterfowl Research Centre provides field training for wildlife students. Currently, four Ontario universities are using the Niska facilities to conduct research on subjects ranging from mercury

poisoning in ducks to nesting behavior in snow geese.

The Ontario Waterfowl Research Foundation, along with the Department of Lands and Forests, is also re-establishing the giant Canada goose in southern Ontario. Many of the free-flying geese from Niska disperse into the surrounding countryside to nest. In addition, 45 pairs of two-year-old birds were released last year on ponds of private landowners, the plan being that they would nest, migrate south with their young, then return this year to nest. Some of them have done so and the plan is being expanded.

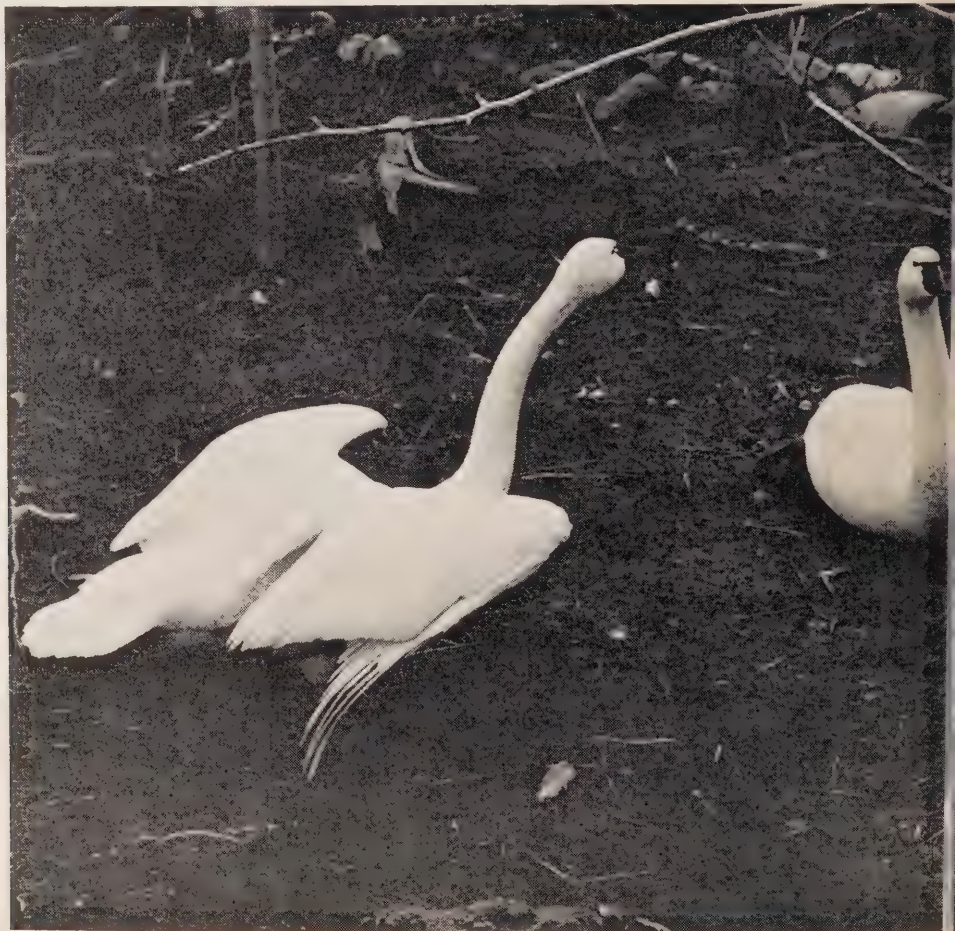
Niska staff also conduct research on the reproduction and maintenance of waterfowl in captivity. The station has bred several species which have been hard to propagate in captivity, including the majestic whistling swan.

The research facilities include modern electric incubators and brooders — the bulk of the hatching is done in seven large incubators, each having a holding capacity of about 2,500 duck eggs or 720 goose eggs.

Hatching waterfowl is not a simple matter. The eggs have to be kept slightly moist



Ducklings are hatched out in electric incubators at Niska, breeding ground of some rare species including the whistling swan, right. Photo on extreme right illustrates the beautiful park-like setting of this waterfowl preserve.





all times, just as if they were in contact with the moist feathers of a female duck. Consequently, the incubators at Niska have specially-designed electric humidifiers which drip water from the top and spray a fine mist from the bottom so that the eggs incubate at the proper humidity.

Another problem is that the large eggs of geese and swans generate a surprising amount of heat, and too much heat will kill the gosling and duckling embryos. To prevent this, the incubators have small, thermostatically-controlled solenoids which automatically allow cold water to enter the incubator cooling coils when the temperature rises to 100 degrees.

The incubation period varies among the different species of waterfowl. The tiny blue-winged teal egg hatches in 23 days, while the trumpeter swan egg takes 35 days. An egg from a Canada goose takes 28 days to hatch. As the eggs are incubating, they are "candled" periodically by Niska staff. The candling process involves holding the egg against an electric light which projects a strong beam of light through the egg, thus exposing the developing duckling or gosling embryo.

The first candling is done to ensure that all the eggs in the incubators are fertile. Infertile eggs are immediately discarded. Subsequent candlings show whether the embryo inside is alive and growing.

After the ducklings and goslings are hatched, they are brooded in electric brooders, each having five tiers. The young waterfowl are kept in these brooders for three to four weeks, after which they would no longer need to be brooded in nature.

The research station, however, is only part of the work of the foundation. The other portion is the Kortright Waterfowl Park.

"The waterfowl park was opened to the public in 1967," says Bill Carrick. "It was named in honor of Francis H. Kortright who, as founder of the Canadian National Sportsmen's Show, must rank as one of Canada's outstanding conservationists. Mr. Kortright, the author of 'Ducks, Geese and Swans of North America,' also ranks as one of this continent's most knowledgeable waterfowl authorities."

Kortright Waterfowl Park has on exhibit the finest collection of wildfowl in North America. The collection, which numbers

about 2,000 birds of more than 60 species from all parts of the world, attracts thousands of visitors every year, ranging from ardent bird watchers to families out for a casual stroll.

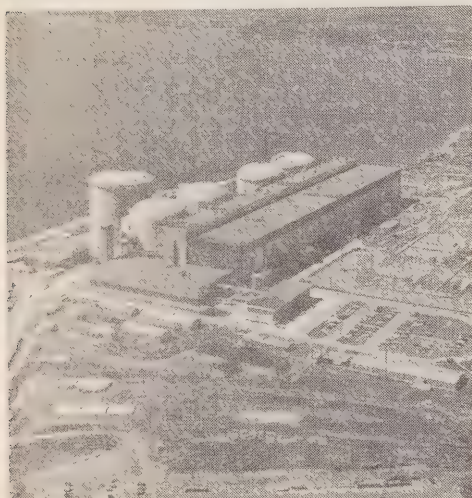
The park also offers unrivaled opportunities for photographing ducks and geese at close range. During the spring and early fall, natural history classes from many schools make field trips to the park. Last year, over 200 such classes visited Kortright.

The purpose of the Kortright Waterfowl Park is to arouse public interest and support for waterfowl management and conservation by means of the display of wild waterfowl. It ensures that the legacy provided by the sight of wild ducks slanting into a marsh against a summer sunset, the very act of life expressed in a skein of migrating geese silhouetted against the spring sky, or the grandeur of the distant swans' voices softly penetrating the evening mists of autumn, will not be given up by our generation or by those who follow us.

candu: variations on c

by Bob Morrow

Each day sees Pickering increase in significance and stature as a major Canadian achievement



CANDU: Pickering

The eyes of the world's electric utility systems have long been attracted to Pickering as one of the world's largest nuclear plants and international interest has been heightened because the natural uranium, heavy water reactor design is uniquely Canadian.

But now that Pickering's first 540,000-kilowatt generating unit is operating at full power and its second reactor has started up, interest is bound to be keener in a hotly-competitive field which involves national prestige.

Pickering, designed by Atomic Energy of Canada Limited and Ontario Hydro, is the first nuclear station built, owned and operated by a Canadian utility. It is located east of Toronto on Lake Ontario.

Two years from now, when all four generating units are scheduled for operation, the plant will provide sufficient energy to supply 1,700,000 homes. The initial 464-ton fuel load for the station's four reactors is the energy equivalent of 10 million tons of coal.

Successful operation will mark a major advance in the production of electricity

from the atom at costs competitive with, or less than, those of fossil-fuelled plants. In addition, Pickering's success should help to make inroads for the Canadian Deuterium Uranium (CANDU) system in the world-wide nuclear reactor market, particularly among a number of wait-and-see nations.

Other encouraging signs are that two other CANDUs have started up this year — a 250,000-kilowatt station at Gentilly, Que., and a 137,000-kilowatt plant designed and built by Canadian General Electric Co. in Karachi. The first of two 200,000-kilowatt units at the CANDU plant at Rajasthan in India is expected to be started up by year-end.

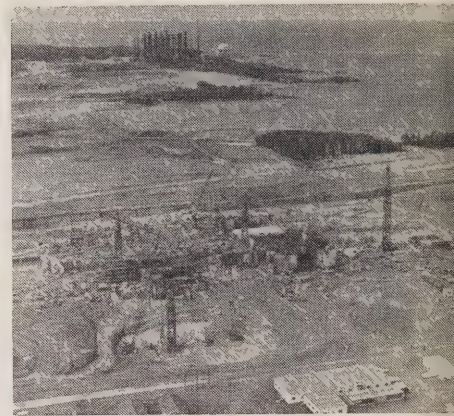
With its 540,000-kilowatt units, Pickering represents a major scale-up from the 200,000-kilowatt Douglas Point station, which started up in 1967, and the 25,000-kilowatt Nuclear Power Demonstration (NPD) plant at Rolphton, which has operated successfully since 1962. Beyond Pickering, Hydro has started work on even larger units at the 3,200,000-kilowatt Bruce station, adjacent to Douglas Point on Lake Huron.

There's a growing world consensus that nuclear-electric power has arrived just in the nick of time as shortages of fossil fuels — low-sulphur coal, oil and gas — are occasioned by one factor or another and push up the cost of conventional power generation.

And nuclear power is gaining recognition as a means not only to provide abundant supplies of low-cost energy, but also to preserve the environment and to conserve dwindling natural resources.



CANDU: Karachi



CANDU: Bruce

M. King Hubbert, of the U.S. Geological Survey, has pointed up the contrast between the geological time of approximately 700 million years required for the accumulation of the world's fossil fuels and the brief three or four centuries of human history required for its annihilation.

Although we have consumed only 1.8 per cent of the world's mineable reserves of coal, and only 13.6 per cent of the reserves of oil, at the rate at which consumption is increasing it won't take us long to finish off the balance. Sixty-one years from now, only 10 per cent of the oil will remain. Within the next 300 or 400 years 90 per cent of the coal will be used up. "Of the remaining power sources, those of tidal and geothermal power are inadequate, direct conversion of solar energy unpromising, and water power is large but also inadequate," says Mr. Hubbert.

"This leaves only nuclear energy with enough magnitude to meet the world's power requirements at present or high levels for a longer period of time."

Ontario Hydro's coal consumption is expected to double over the next 20 years from 8.5 million tons last year to 18 million tons in 1990, but then it will provide only about 30 per cent of the capacity required, compared with the 50 per cent now contributes.

Nuclear power is expected to provide 50 per cent of the capacity at that time. The Hydro's planned system fits very well

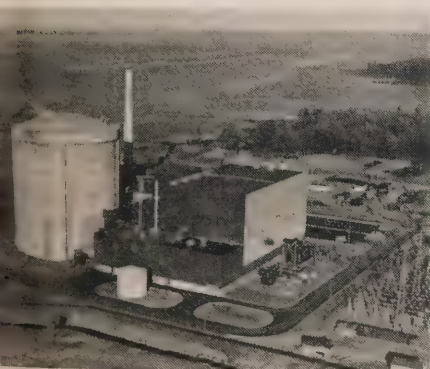
nuclear theme

predictions for world energy generation — heavy reliance on nuclear power with a strong back-up of coal and relatively smaller back-up from hydraulic, oil and gas-fired stations.

It is estimated that by 1980, the world's nuclear generating capacity will increase tenfold to 250,000 megawatts to meet demands for electric energy which tend to double every decade. The U.S., of course, has the largest program underway, with more than 120 nuclear power plants, representing about 99,000 megawatts of capacity, are in various stages of planning, design construction or operation.

One of the reasons for the swing to nuclear power is coming more into focus in the United Kingdom, where it has already established a clear economic lead over alternative fuels for the production of electricity.

The 1960's were years of research, development and the formation of a new enterprise in the U.S. and Canada. This decade will witness the new industry's growth to a



CANDU: Gentilly

A multi-billion dollar business capable of supplying clean, efficient energy at a reasonable cost.

Canadian reactors are designed to make efficient use of Canada's abundant supplies of natural uranium (U_3O_8), present reserves of which are known to be about 1,000,000 tons.

General energy, mines and resources minister J. J. Greene, says of these reserves that more than 25 per cent has been committed to domestic and world markets. Thus, there's

still plenty to fuel CANDU reactors for many years.

Indeed, Canada has pioneered and brought to the stage of large-scale commercial application a nuclear power system that is without equal among proven, present-day



CANDU: Rajasthan

types in making efficient and economical use of natural uranium fuel.

What sets it apart from all the others is its economical use of neutrons, the fundamental particles that sustain the fission process in a reactor, and its remarkable flexibility.

For 25 years, Canadian reactors have existed in a state of continual change — a source of strength that augurs well for future development. Flexibility is, in fact, the key to success in a rapidly-changing world.

For this reason Pickering, or even Bruce, can't for long be considered the last word in nuclear technology. But they are necessary steps along the road to gaining expertise and to proving CANDU's potential.

Glancing back, we can see how far we have come from Zeep (1945) an experimental reactor which produced as much heat as a light bulb; NRX (1947) Canada's first research reactor at Chalk River; NRU, (1957) the world's first reactor in which fuel could be changed while operating at full power; and NPD, which began producing electricity at Rolphton in 1962.

And already there are a number of signs which indicate the road ahead could have several branches.

The steady evolution of the CANDU system has led to significant differences between Douglas Point, Pickering and Bruce. These reactors are basically the same to the extent that they "burn" natural uranium and use heavy water for moderation and heat transport. But there have been changes in the direction of lower capital costs per kilowatt, simplified systems and operational flexibility.

Future variations could involve ordinary water or oil-like organic fluids in the heat transport system, higher-density fuels, or new fuel cycles involving enriched uranium, man-made plutonium (U-239) or a combination of thorium and uranium-233. But these are long-term projects which can be built only when the required technology has been developed and when economic conditions warrant their construction.

Three CANDU variations, however, are now in operation:

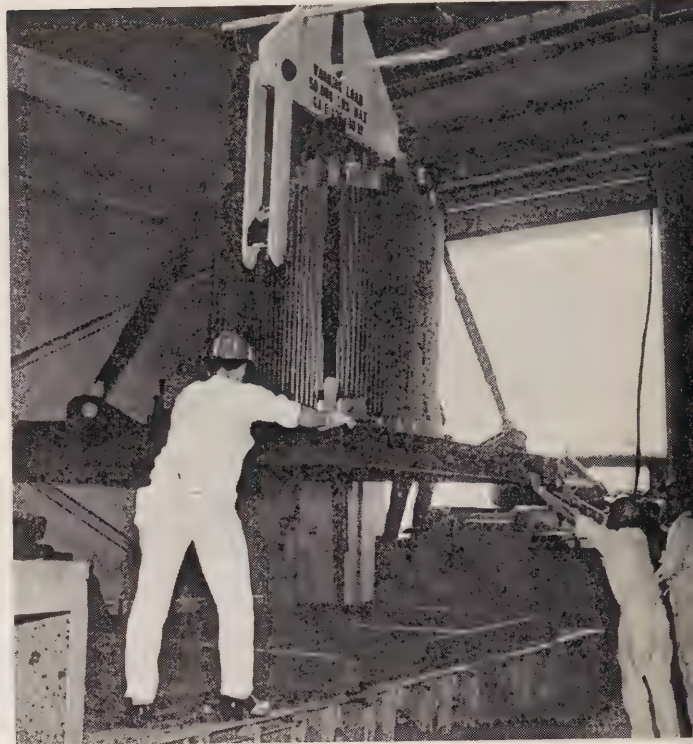
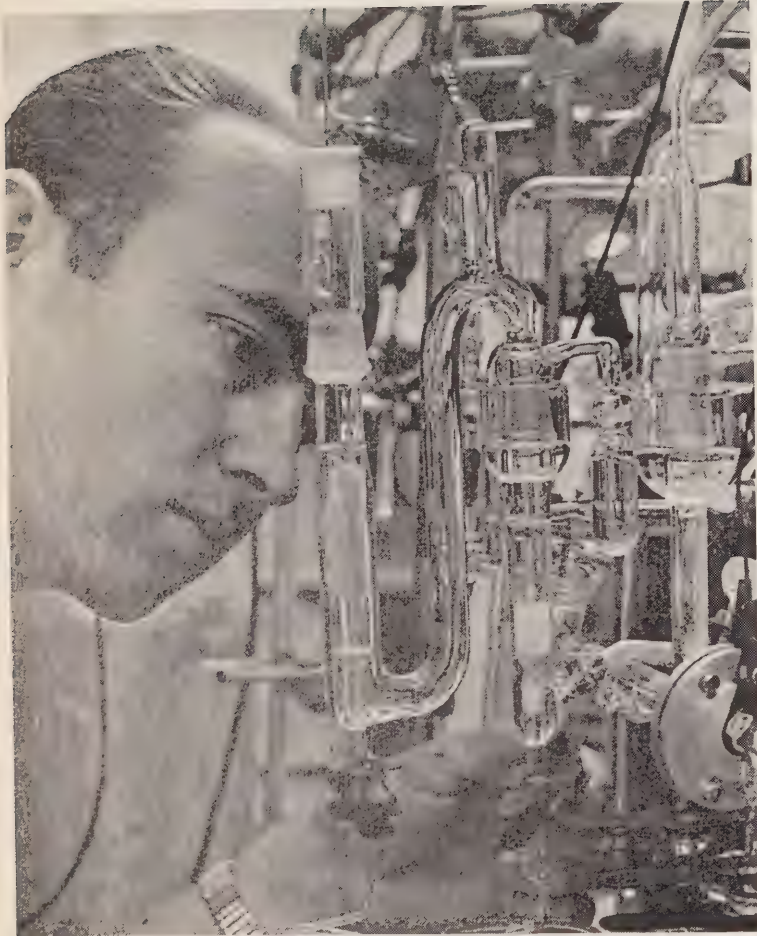
- * NPD has been successfully modified to allow boiling of the heavy water in the heat-transport circuit. In addition, experimental bundles of a new high-density fuel, uranium silicide, are being tested there.

- * Another prototype is the station at Gentilly, Quebec, which started up in November, 1970, and is the first natural-uranium plant to use boiling light water (that is, ordinary water) as the reactor heat transport medium. Use of ordinary water rather than heavy water offers the promise of lower capital and operating costs. The Gentilly reactor differs from other CANDUs in that the reactor is vertical



CANDU: Douglas Point

Diversity of Canada's growing nuclear industry is well illustrated by these three photos, which show research into heavy water separation techniques, spent fuel being loaded at the Douglas Point power station for shipment to France and equipment, bottom, for the examination of uranium-silicide fuel specimens. At right, tubes are seen being inserted into one of the calandrias at Pickering generating station.



ner than horizontal and on-power fuel-
g is done from one end with a single
lling machine.

or several years, an organic-cooled,
vy-water-moderated test reactor has
en operated by AECL at Whiteshell,
n. This concept permits efficient heat
nsfer at higher operating temperatures
n other CANDUs and promises possible
ings in capital cost, maintenance and
erations. A denser fuel combining
nium and carbon (uranium carbide) is
ng tested in Chalk River's NRU reactor
Whiteshell.

gher-density fuels would permit the
raction of more heat from each fuel unit.
el fabrication costs would be higher,
t the gain would be a more compact
ctor with lower capital costs.

other target set by AECL is to increase
overall station efficiency from 30 to 40
cent, which would be comparable with
dern coal-fired stations. Success would
an that more heat would be used to
enerate power and less would be re-
ted in the cooling water to cause poten-
environmental problems.

discussing CANDU and other reactor
tems, Ontario Hydro Chairman George
thercole has pointed out that it should
be surprising that there may be different
ites to the goal of economic and reliable
clear power.

le believe the CANDU system shows
at promise, but that does not mean we
ignoring other systems. Our opinions
always open and we are continually
essing the situation."

sides making use of Canadian research
d scientific talents, Canadian reactors
duce an important by-product which
kes them near-breeders.

all quantities of plutonium are formed
ide fuel bundles when fertile U-238
ms capture neutrons. This plutonium
n be stored in the station spent fuel bay,
d for reprocessing or even recycled

through Canadian reactors whenever this
proves economically worthwhile.

For example, AECL has sold Douglas Point
spent fuel containing plutonium to France
for use in experimental reactors. Similarly,
this fission by-product, valued at up to \$30
a gram, will be a bonus for Hydro at
Pickering and Bruce. By 1981, Hydro
could have a "plutonium mine" of 8,000
kilograms and be capable of producing an
additional 2,000 kilograms a year.

Pickering has opened up opportunities for
many Canadian companies to enter the
nuclear power field and develop tech-
nology for both domestic and export pur-
poses. For example, contracts worth more
than \$300 million have been awarded to
about 900 companies for the construction
of Pickering. Such experience will prove
invaluable in building the Bruce project.

In addition to producing electricity eco-
nomically, Pickering will provide radio-
active cobalt-60 for a growing number of
uses in medicine, agriculture and industry.
Much of the cobalt will be used in
Canadian-made cancer therapy units,
which are sold throughout the world.

Gradually, but with growing assurance, the
Canadian nuclear industry has been
developing the basis for future expansion.

Lloyd Secord, past president of the
Canadian Nuclear Association, suggests
that by the year 2000 Canada's share of
the reactor market could be \$50 billion.
This would make the Canadian nuclear
industry one of the more dominant features
in the economy.

"It is insensitive to inflation, once built,
because it is cheap to operate. Our nuclear
program has been Canada's most extensive
scientific venture and we have proved it
to be a winning concept."

The potential is there because Canada has
a good nuclear process, one that is differ-
ent from its major competitors, and one for
which a world-wide market is developing,
he said.

And beyond our shores, the atom could be
a real boon in helping developing countries
to solve or alleviate basic problems by
desalting sea water or powering agricul-
tural-industrial complexes. □



the uncertain seventies

This decade, perhaps more than any other in Ontario's history, is clouded with uncertainties. Change is the essence of the times and to project present growth trends without qualifications would be as foolhardy as diving into shallow water.



Perhaps the best we can do is state what can reasonably be expected to happen and predict some surprises.

We live in an age of discontinuity. On August 15, for example, the United States announced a fundamental change in economic policy which marks the end of the supremacy of the U.S. dollar as an international measure of value.

Such dramatic change doesn't happen often. It means that the rules by which international trade and payments have been conducted since the Bretton Woods agreement of 1946 have gone by the board.

Until we have a new system, all forecasting is off, especially in Canada which

earns so much of its living from international trade.

In what follows, it must be assumed that new order emerges and that the trading and financial worlds do not split up into protectionist blocs. Hope lies in the deterrent effect of what happened in the Hungry 30's.

Whether we think growth desirable or not, the underlying forces which will shape our future are apparent and trends show the general direction in which we are heading.

Forecasters generally agree we can expect an increase in population, continued growth of urban areas, fewer farms, an expanding provincial product, and rising standards of living.

More women are expected to enter the labor force and large numbers of young people now in school will be seeking jobs. There will be an increase in new families, accompanied by strong demand for houses, apartments, cottages and consumer goods.

But the seventies promise to be a bumpy decade with a heightened social sense. Uncertainties crowd into the picture when forecasters attempt to assess the impact of changing attitudes and lifestyles on forces now at work.

The effect of the "pill" on population growth is unknown, but presumably we shall see a low birth rate and smaller families.

City growth may be modified by government efforts to control or re-direct urban expansion and, perhaps, by the expansion of rapid transit facilities.

Output of goods and services hinges, of course, on a favorable economic climate here and abroad and on increased productivity, particularly in the growing service industries.

"A shift is taking place at the present time from the highly productive goods industries into the less productive service industries in which it is more difficult to increase output by simply adding capital," says Hydro economist Larry Higgins.

"It seems to me that the answer to the problem lies more in the direction of finding more efficient ways of doing things, perhaps through use of the computer."

Women's lib and changing work attitudes, particularly among young people, may well affect the rate of new family formations and of housing construction.

More emphasis on the environment

Expectations of rising standards of living are tempered by increasing emphasis on the quality of life and protecting the environment, which entail increasing costs. These will eventually be reflected in the price of goods and, perhaps, in the amount of disposable income.

One way or another, all of these factors will affect the demand for electrical service provided by Ontario Hydro and the associated municipal utilities in the seventies.

Ontario's population in 1981 has been conservatively estimated at 9,333,000, about a 20 per cent increase over 1971.

This growth will reflect in power demands which will be expanded, too, by a continued rise in the average residential and farm consumption. But, as now, about 65 per cent of the power will be used by industry and commerce.

During the seventies, Ontario Hydro expects primary demands will more than double, requiring an outlay of more than \$2.5 billion on new generating stations and transmission facilities over the next seven years. Projects now under way will add almost 12 million kilowatts to the system between now and 1978. After 1978, an extra 1.5 million kilowatts will be required every year to maintain adequate reserves.

Steady growth is expected in industrial demands, which include resource and

Last of a four-part series by Bob Morrow on the development of public power in Ontario.

manufacturing industries. However, more emphasis on secondary manufacturing, which requires less energy than mines and forest industries, will likely mean a declining share of the market for industrial uses.

Yet Hydro must be prepared to meet unforeseen demands for power created by new developments. The Texas Gulf Sulphur copper-zinc find near Timmins in 1964, for example, has created a demand for 100,000 kilowatts to supply the Kidd Creek mine and a concentration plant, now in operation, together with a zinc refinery scheduled for initial operation in 1972.

Next year, too, Mattagami Mines Ltd. will require an initial 10,000 kilowatts to develop a major deposit of copper, lead, zinc and silver found in the Sturgeon Lake area of Northwestern Ontario in 1969. Other new mines are expected to be developed in this area.

Examples of new industrial demands include a steel rolling mill starting up this year at L'Original, near Hawkesbury, which is expected to be expanded to use electric arc furnaces, and a \$50 million cement plant at Bath, near Kingston, scheduled for operation in 1973.

Urban development will intensify

Commercial use of electricity, which has been growing more than 10 per cent a year since World War II, will continue to be a dynamic sector. Two dramatic examples of this trend are now under construction in Toronto.

Commerce Court, the Canadian Imperial Bank of Commerce's new all-electric headquarters in the downtown area, will have 2.7 million square feet of space with year-round environmental control. The Manufacturers Life Centre at Bay and Bloor streets is another all-electric project involving a 51-storey apartment building, a 22-storey office building, retail stores, an underground shopping mall, a theatre and extensive snow-melting installations.

Smaller but relatively important commercial developments are taking place in many Ontario centres. Along with continued population growth, these will have important implications for the municipal utilities.

A recent study of five metropolitan areas conducted for the federal government indicates the trend. By 1981, population gains are expected to be 149,000 for Ottawa, 123,000 for Hamilton, 60,000 for London, 37,000 for Windsor, and a whopping 1.2 million for Metro Toronto.

In another study, the Toronto Real Estate Board predicts half of the new houses built for sale by 1980 will be constructed beyond Metro Toronto's present boundaries and that urbanization will intensify in the Hamilton-Barrie-Oshawa triangle.

But in addition to more people, the historic growth in household consumption is expected to continue. A major reason is that new appliances use more electricity: A 14-cubic-foot refrigerator uses about 3½ times as many kilowatt-hours as a 9-cubic-foot model. Another factor is the growing popularity of electric heat and air-conditioning for year-round comfort control.

Factory farms on the rise

In rural areas, electricity will continue to play an important role in food production. The decline of the family farm has been accompanied by a trend toward large, automated "factory farms" which require large amounts of power. Some individual farmers today use as much electric energy as an industry or a municipal utility serving a town with 700 to 800 residential customers.

When demands from all these sources are combined, they account for the massive Hydro expansion program under way in the province until 1978. But that's only part of the Hydro outlook for the seventies.

To meet its future needs, Ontario Hydro must acquire 50 per cent more land over the next few years than has been acquired since 1906 for generation and transmission facilities. At the same time, land costs are rising and Hydro enjoys less latitude in acquiring rights-of-way.

Videophones and electric cars

Decisions are pending, too, on the type of thermal-electric stations to be built to supply demands beyond 1978. Many factors enter into such decisions, but important considerations will include financing, the availability of low-sulphur fuel to meet air pollution regulations, possible development of sulphur removal processes and the successful performance of large nuclear units.

Particularly for municipal utilities, the creation of regional municipalities in Ottawa-Carleton, Niagara, Muskoka and York County foreshadows changes. A

pattern may be set in the new regional municipality of Niagara where the OMEA has recommended retention of seven elected commissions and the absorption of four utilities into Ontario Hydro's rural system.

In a brief to the provincial government, the OMEA said the guiding principles in its recommendations were that municipal owned electric utilities should be managed by elected commissioners and that utility service areas should coincide with municipal boundaries.

Any change in the municipal utility setup, however, awaits development of general government policy on the relationship between Hydro commissions and regional government.

Other uncertainties for Hydro revolve around environmental issues, which may lead to increased demands for electricity for pollution control, sewage disposal, recycling of wastes, rapid transit and electric cars.

In addition, communications devices such as the videophone, cable TV, remote computer terminals and mini-computer may change our lives in unpredictable ways.

Change calls for flexibility

New uses for electricity keep popping up, too. Microwave ovens, garbage compactors and air-cleaning devices, now available for the home, will likely see more widespread use. Yet to come are ultrasonic dishwashers and laundry equipment, electric bathtubs that can be preset for temperature and water level, and more extensive use of heat pumps for heating and cooling.

Even more exotic applications of electricity — and perhaps more efficient in terms of power use — may evolve from the development of lasers, transistors, longer life batteries and fuel cells.

The changing scene indeed calls for a flexible stance by the Hydro enterprise, now in its seventh decade of service. The main challenge will be to shape Hydro's inevitable growth to conform with the social, economic and environmental needs of the times.

Profound misgivings exist in some circles today about growth of any description, but, ultimately, value judgments must be made through the political process. Hydro and the municipal utilities, however, will be expected to provide leadership in choosing the best options for the province's electrical future. □

Life (and work) in the big land

by Rae Hopkins



The old dirt trail winds its way south from the Trans-Canada Highway.

It skirts rock, pine, poplars, and blueberries, pushing its way relentlessly toward Lake Superior. You know you're on the right road because the imprint of a big tracked vehicle is there in the dust. Every few yards there's muskeg in the pathway and your foot sinks deep into the slime — this is no place for dress oxfords.

It's hot and humid and the blackflies are hungry in this area just outside industrial Thunder Bay. Yet this is familiar terrain to Ontario Hydro line crews hoisted 75 feet above the ground by the Foremost, a vehicle that looks like a cross between a crane and a Sherman tank.

They're carrying out routine maintenance on a 115,000-volt line that feeds power to the city born of two. And while the muskeg and the blackflies on this particular job make the going rough, the people charged with the responsibility of maintaining power supplies know it could be rougher — much rougher.

This is Northwestern Ontario, a vast expanse of land equal in size to France and accounting for 40 per cent of the province's total area.

With its extremely rugged terrain punctuated by thousands of inland lakes, large and small, jagged rocks and virgin forests, Northwestern Ontario has a beauty all its own and holds a strange fascination for those who live there.

Although the region is long on miles, it's short on people. In 1970, the population was a mere 227,300, while a year earlier the Borough of Etobicoke, which covers 48.4 square miles, recorded a population figure of 269,000.

It's this lack of people, and the distance between concentrations of population, which gives the northland most of its

problems. And they're problems common to Ontario Hydro's Northwestern Region operations personnel, whose duty it is to provide power over 94,800 square miles of the "big country."

Says operating superintendent Paul Cormier, as he ponders a system map in his fourth floor office in the Thunder Bay Hydro building: "We're somewhat different here compared with down east in that we're operating in a capital intensive region. By far the greatest percentage of our load is industrial."

"Up here pulp and paper accounts for about 73 per cent of our industrial load, mining another 23 per cent and the chemical industry takes the remaining 4 per cent of our industrial power. Quite the reverse of down east."

While Paul Cormier and his operating supervisor, Ray Kotanen, confer on the weekly line and equipment maintenance schedule, just outside the office door Mr. Kotanen's counterpart, Lorne Jeffers, touches a match to his cigar, spreads charts depicting the water levels of the north's vast drainage area, and attempts to determine the amount of water available for power generation.

With the exception of the 100,000-kilowatt Thunder Bay coal-burning plant, every generating station in the Northwest is hydro-electric and storage control is of vital importance.

Just as Mr. Jeffers begins his calculations, the phone rings. A crew wants to reduce generation at one of the more remote plants to carry out some maintenance work. As Lorne scans the charts, he notes that a shutdown at this time will result in a "spill situation."

"Spilling water is tantamount to throwing away dollars," he says. "You see, when we find excess water we schedule our generation for full output — 24 hours a day. It's imperative that we contain the run-off during the freshet period, and one way to do it is to run full out."

"Of course, with the east-west tie-line (the 500-mile stretch of 230,000-volt cable which weds Ontario's east and west power networks) working now, we've no waste at all. What we don't require here, we merely feed into the east system — it sure saves on their coal piles down there."

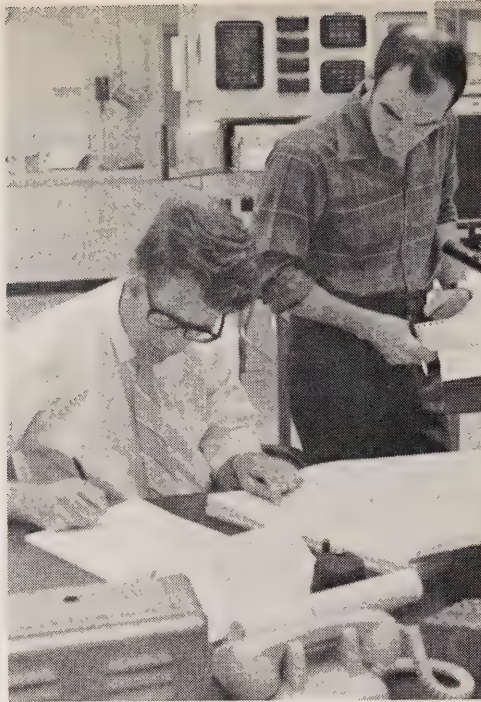
Three times over the past 30 years, the courses of several north-flowing rivers have been turned south. Two of them pour

Most families have now left the long-established colony at Cameron Falls as generating stations along the turbulent Nipigon River are converted to remote control.





From left, Art Sherren and Lew Edmunds control many of the north's hydro-electric plants from the new Lakehead transformer station; Lorne Jeffers, Paul Cormier and Ray Kotanen tackle an operating problem; area manager Jack Hamer and area sales and service superintendent Ed Armstrong examine map of territory they cover. Far right: water must be kept flowing over Kakabeka Falls, a major tourist attraction.



more water into the Great Lakes. The effects have proved a boon to the Great Lakes shipping industry and have been felt as far away as Niagara Falls and Cornwall, where the increased water supply has benefited power stations on both sides of the Canadian-U.S. border.

Just before the start of the Second World War, Hydro's construction forces rerouted the flow from Long Lac southward. Previously, the Long Lac flow followed a northward course through the Kenogami River and into the Albany, which empties into James Bay.

By channelling through a height of land separating the northern and southern watersheds, Hydro forces turned the flow around and through a chain of water-courses into the Aguasabon River and Lake Superior. Benefits from this diversion included the building of the 40,500-kilowatt Aguasabon generating station at Terrace Bay, 135 miles east of Thunder Bay, and a log-driving route to the Kimberly-Clark paper mill nearby.

As the tempo of the war in Europe increased, and industry demanded more and more power for the war effort, construction workers again invaded the frozen north to divert the flow from the Ogoki River, also a tributary of the Albany, into Lake Nipigon and thence into Lake Superior.

This second diversion greatly improved operating conditions along Hydro's impressive chain of generating stations dotted

along the Nipigon. It also enabled more water to be utilized at Niagara Falls for power production.

Then, on a raw September day in 1957 demolitionists touched off two-and-a-tons of explosives to blast away an earthen barrier — last remaining obstacle between Lake St. Joseph and the Root River — to alter the course of yet another waterway. The Lake St. Joseph run-off found a storage basin in placid Lac Seul, head of the Ear Falls generating station on the English River.

For thousands of years, Lake St. Joseph had been separated from the Root River by a mere three-quarter-mile watershed and had drained northeast into the Albany and eventually into James Bay. Now energy is generated not only in Ontario from this water, but at a half dozen places on Manitoba's Winnipeg River, with which the English River merges below Carleton Place.

But generating stations are by no means the only consideration where water flow is concerned. "We must ensure that water levels are maintained for the vacationers," says Mr. Jeffers, "and, of course, we must also ensure a minimum flow of 300 cubic feet a second on weekends over Kakabeka Falls — the Niagara of the North — and 150 cubic feet a second on weekdays."



the operation of generating stations, automation has come to the north country. For example, assistant regional operator W. J. Edmunds pushes a button at the new Lakehead transformer station, about 10 miles east of Thunder Bay, and wicket gates begin to close at Silver Falls generating station, 35 miles distant. In seconds, the gates have shifted and telemetering notifies the operator that generation at the plant has been reduced to the desired output.

Automatic controls have been installed at most remote stations, where the cost of manual operation is excessively high. For instance, the long-established Hydro plant at Cameron Falls is rapidly disappearing as the remainder of the families, numbering 50, move south to the town of Nipigon. Remote control facilities now permit three generating plants to be operated from one control room at Cameron Falls and will ultimately see all generation on the turbulent Nipigon River controlled from Lakehead transformer station.

This is the land of paper mill towns, logging operations, railway divisional points and base metal mining operations. And for the crews of Ontario Hydro's Thunder Bay area, it's a big land. Area manager Jack Hamer says service crews may be called out to remote mines or lonely summer cottages. It's not at all common for a crew to leave the Thunder Bay service yard early Monday morning and not return for a week.

"Customer density," says Mr. Hamer as he gazes at a map depicting most of the area as unsurveyed territory, "is our major problem. The density is low and the customers are widely separated, which makes for difficult working conditions at times — but the service is every bit as good as down east.

"Up here, our crews have to be extremely versatile. For instance, they may be called out to Upsala, where there's probably 40 customers and a few roadside gas stations. It's a headquarters for bush operations, so there isn't too much there. And when they get there they have to correct the trouble — that may even mean having to chop a tree to replace a fallen pole, or to make a new cross-arm.

"But up here the boys know how to improvise. Because of the vast geographical distances and the nature of the terrain, it isn't too long before our vehicles are out of radio range. Our boys work in temperatures that swing from the 90's to 50 below zero with a wind chill factor on top of that.

"They go out on snow shoes, skidoos, or in helicopters and they need to carry booster batteries just to get the trucks started in the morning. It's nothing to find the trucks with frozen gas lines, but it's still a very sobering thought for the fellows that an entire town — say Manitouage or White River — could freeze solid in five to six hours if power isn't restored."

A typical example of the distances involved, says Mr. Hamer, might be a new house ready for connection in White River. A crew sets off from Terrace Bay, on the 260-mile round trip. The job itself takes, at the most, half-an-hour. Another example was the morning Mr. Hamer set out from his spacious office, filled with Indian and Eskimo carvings, to attend a meeting with officials of the Department of Lands and Forests to discuss the area's brush spraying program. His mileage totalled 375 for the round trip — the meeting lasted an hour.

"Spotting a moose or bear watching the boys at work is something that hardly rates a second look. And there are still plenty of occasions where they revert to plain bullwork. There are plenty of times when a guy will walk 10 miles through the bush carrying a crate of insulators on his back — that's 100 pounds — and he'll be fighting blackflies and muskeg every step of the way.

"But work up here sure brings the man out in the boy. It's really surprising how soon you learn where the access trails are and how to cross a river where there's no bridge.

"The surprising thing about it is, though, that almost without exception very few apply for jobs in the east."

Jack Hamer's eyes turn again to the map. He says with a smile: "That's what we work in up here — unsurveyed territory."

voice of the north

Delegates from municipal electric utilities across Northern Ontario and Muskoka discussed a wide range of topics at fall meetings, including cable tv, remote meter reading, regional government and labor relations.

district

3

More electricity, not less, to fight pollution

Greater use of electricity, not less, is needed to improve today's standard of living and effectively control pollution, says K. N. Bodkin, manager of Ontario Hydro's Northwestern region.

Speaking to District 3 delegates in Thunder Bay, Mr. Bodkin suggested the only way to improve the standard of living is to create more wealth. "This means," he said, "further development of our natural resources, and electricity is the key to that development.

"We cannot curtail its use without lowering our standard of living and, for that matter, limiting our ability to clean up the environment," Mr. Bodkin said.

Striking back at the zero growth proponents, he said a number of people today question the need for growth. They feel that growth should be slowed down — particularly population growth. "They believe that

unless drastic action is taken man is doomed. They feel government and industry are traditionally slow to act, and this is why they try to build up public pressure to force action.

"As far as some electrical utilities are concerned, it's no longer a question of whether new plant or facilities will conform to regulations, but whether they should be built at all. In other words, by curtailing electrical utility expansion they hope to achieve some control over economic and population growth."

But, he pointed out, electricity is energy in its cleanest, most flexible and convenient form. "Were it to be replaced by other forms of energy, all of which contribute varying degrees of pollution to the atmosphere, there would certainly be a more harmful effect on the total environment."

Admittedly, the production of electricity does involve environmental side-effects. However, Mr. Bodkin said, the efficient and highly-controlled consumption of fossil-fuels in the production of electric power represents the most advantageous use of them from an environmental viewpoint.

The regional manager suggested electricity should and could be put to greater use in heating and air-conditioning, transportation, for industrial purposes, in sewage treatment and garbage disposal, in recycling paper, glass, metal and other waste products, and in purifying the air and water.

"The ultimate solution to our environmental dilemma," Mr. Bodkin said, "lies in greater, not less, use of electric energy."

Electrical demands in the Northwest reached an all-time high during 1970 of

682,000 kilowatts and, despite a slump in mid-1971, are expected to conform to the long-term growth pattern — doubling every 10 to 11 years.

Mr. Bodkin noted that last year had been an "outstanding one" for sales achievement, with a record 414 more electrical heated homes in the region. An additional 400 installations are expected this year.

Thunder Bay reaches for the top

Thunder Bay Hydro has called on municipal electric utilities in the Northwest to support its sponsorship of the CBC student program "Reach For The Top," an "excellent public relations program for District 3 of the OMEA.

"Although it's not technically possible at the moment to beam the program into municipalities in the Northwest from CBC's Winnipeg satellite, we expect it to be in the near future," said president-elect Jim Currie, of Thunder Bay.

He added that sponsorship of the show which pits teams of top students from high schools in the district against each other in a test of their knowledge ranging from the arts to mathematics, costs utility about 40 cents a customer.

Winners in the various zones compete for the Canadian championship.

Provincial OMEA president And Frame suggested there is "no better program on Canadian television and no better opportunity for District 3 to get its message across than by throwing 100 per

district 3



Some of the men who will lead District 3 for the coming year are seen with OMEA President Andrew Frame. Standing: E. G. Caccamo, Schreiber; M. H. Kelly, Atikokan, secretary-treasurer; Mr. Frame; F. M. England, Kenora; W. W. Laakso, Thunder Bay; A. J. Marshall, Fort Frances, past president. Seated: E. J. Hawthorne, Dryden, second vice-president; James Currie, Thunder Bay, president; W. H. Calder, Atikokan, first vice-president.

support behind Thunder Bay Hydro in sponsorship."

Mr. Frame suggested the District could use "just five seconds" of each utility commercial to get the OMEA and municipal hydro message beamed into households over the Northwest.

"This is the kind of program we need to get our message across. We in the municipal electric utilities are being challenged. There are those in all parties who would like to see Ontario Hydro become nothing more than a department of the provincial government and the municipalities just another committee of council. We must not let this happen, and one way to help prevent it is through sponsorship of a television program like this," Mr. Frame said. □



Participants in a labor relations panel included Alex Grant, an Ontario Hydro labor relations officer, moderator J. R. Philips, Brockville, and D. M. Seath, general manager of Stratford PUC. Mr. Seath told delegates that union whipsawing is hurting utilities.

Whipsawing 'taking toll'

Whipsawing by trade unions is taking its toll of the municipal utilities' coffers, D. M. Seath, Stratford PUC's general manager, told District 3 delegates.

Mr. Seath, whose employees were the most recent in the province to receive union certification, said the "most obvious thing we ran into during negotiations for our first contract was the pressure brought out by other utility settlements."

One of a labor relations panel, he said one of the benefits awarded in other settlements were granted to employees of utility. "But in no way would Stratford PUC buy an across-the-board settlement. We wanted to consider each category indi-



Welcoming Ontario Hydro Chairman George Gathercole, second from right, to Thunder Bay for the District 3 annual meeting are president A. J. Marshall, of Fort Frances, L. E. Danis, Thunder Bay, and M. H. Kelly, Atikokan, secretary-treasurer. Mr. Danis, Thunder Bay Hydro chairman, has since been appointed an Ontario Hydro commissioner.

vidually and that's exactly what we did," he added.

Mr. Seath urged both utility managers and commissioners to seek and accept collective bargaining advice from the AMEU. "None of us is so sufficiently skilled that we do not need to take and use the advice of the AMEU's labor relations consultant. We must seek out and accept advice of the professionals, not only for our own utility, but for those whose negotiations must follow."

Mr. Seath said his utility negotiated two contracts with the International Brotherhood of Electrical Workers, one for the Hydro and water department employees and the other for the utility's transit workers. (Stratford PUC operates the local bus service.)

He said he took every opportunity to attend AMEU labor relations seminars and urged others to do the same "in case the day comes when you find yourself faced with union certification."

Panelist Alex Grant, an Ontario Hydro senior labor relations officer attached to municipal utilities' negotiations, urged a halt to the practice of granting extra vacation time if the employee agrees to take his annual vacation during the winter months.

"This is wrong in principle. It's a management prerogative to dictate when an employee will take his vacation. This is a management right provided in a union-management agreement and must not be given away. Don't 'bribe' an employee by offering extra paid time off so he will take his vacation during the slack winter months," Mr. Grant said.

Discussing salaries paid to utility employees, Mr. Grant said there are now 14 utilities paying linemen \$5 an hour or better and for each hour a lineman works, many utilities pay half as much again of the hourly rate in fringe benefits.

Wes Edwards, former president of District 9, questioned whether there were many contracts being negotiated where benefits are being passed on to pensioners. "Is this a trend? Are unions seeking the same thing for pensioners that they want for active employees?" Mr. Edwards asked.

Ontario Hydro Chairman George Gathercole suggested unions may introduce any subject they wished into their bargaining agenda, but that doesn't mean management has to negotiate these subjects.

"In the case of Ontario Hydro, the pensioners' association feels it is in a better position to negotiate than the unions. There are many members of the association who were never members of a union during their career and I personally feel pensioners should be kept separate from the unions," Mr. Gathercole said.

Brockville commissioner J. R. Philips moderated the panel. □

district 2

Threat to utilities, says Frame

Andrew Frame, president of the OMEA, told 100 District 2 delegates at the Elgin House that the very existence of the present system of municipal utility commissions in Ontario is threatened.

The challenge, he said, is coming from some local governments, a few members of the legislature and from private consultants.

At the local level, part of the challenge could be attributed to those who look at Hydro revenues as a means of holding down other municipal expenditures. This the utility co-operative must fight, Mr. Frame said. The trend to establish regional governments with larger municipal jurisdictions was creating a situation whereby municipal authorities were unwilling to share the responsibilities with subsidiary bodies.

"Aside from political considerations, Hydro commissions can face a critical challenge by failing to keep pace with changing technology," he said.

"Our customers expect to use every electrical appliance they buy without suffering any power shortage. They will be satisfied with nothing less."

Mr. Frame told delegates they must be prepared to take action to safeguard the present system during the 70's. The message must be transmitted to politicians and to the public. Steps must be taken to safeguard utility revenues and ensure that they are used only for Hydro purposes.

The OMEA president warned that some smaller utilities might have to merge in the interest of greater efficiency. □

Call to end school appliance program

Delegates endorsed a resolution submitted by Stan Darling, of Burks Falls, urging that the OMEA, AMEU and Ontario Hydro marketing co-ordinating committee be

urged to discontinue the supply of appliances in home economics classrooms.

Mr. Darling said that schools are now administered by a district or county board which provides all other classroom equipment. He pointed out that the cost of an appliance program was steadily increasing and he felt the utilities should no longer take the responsibility for supplying equipment.

Another resolution approved was submitted by retiring district president, W. Tomlinson, of Port Elgin, calling for a study to develop a less cumbersome method of borrowing by local commissions.

Mr. Tomlinson pointed out that before a local commission can issue debentures, approval must first be obtained from the local council, Ontario Hydro and the Ontario Municipal Board.

"This method", he declared, "can be very slow and frustrating."

Parry Sound PUC submitted a resolution calling for an improvement in inspection services by Ontario Hydro in Georgian Bay. Commissioner G. Tudhope, said contractors must sometimes wait several days for an inspector to approve electrical installations.

The meeting also heard from Ontario Hydro Chairman George Gathercole and from Maurice MacLaren, a Barrie accountant who talked about utility finances. A new added feature was a slide presentation by Wes Lawler, Ontario Hydro system control engineer, on "Where our power comes from." The talk dealt with the generation and transmission of electricity and the operation of Hydro's Richview control centre.

Must boost loads in cottage country

"The gifts of nature are for the people and the gifts are becoming more and more expensive." This was the gist of remarks at the Elgin House by Ray Griffin, Ontario Hydro manager for Georgian Bay region.

Mr. Griffin said that while the true intent of Hydro's motto was fulfilled — that all people should share in the bounty of electricity — the expense to the people was becoming greater. "Unless we all bend our utmost efforts during the next few years, we may well develop that some people will be denied the gifts."

Mr. Griffin said that Georgian Bay region faces one of the most difficult situations in the province for return on investment. He indicated that improved marketing was essential.

"We live to a great extent in cottage country where loads are of a more intermittent nature. Such loads are not balanced. So we must encourage the

district 2



The men who will conduct the affairs of the Georgian Bay Municipal Electric Association for the coming year include, front row: H. J. Murphy, Barrie, secretary-treasurer; W. E. Theaker, Paisley, president; E. R. Alexander, Barrie, vice-president; John McNab, Orangeville. Back row: H. J. Cameron, Kincardine; C. J. Larsen, Walkerton; W. G. Boyes, Alliston; N. R. Robertson, Owen Sound; G. Tudhope, Parry Sound; S. Darling, Burk's Falls.



Vic Hall, a trustee for Holstein Hydro, receives a certificate from OMEA President Andrew Frame marking 15 years' service to the utility.



Cuff links presented to H. Carlaw, a commissioner of Paisley Hydro, symbolize 25 years' service to the utility.



Archie McGugan, Palmerston PUC, D. K. White, North York Hydro, and A. L. Furanna, London, resident of the AMEU, were caught in deep discussion at the Elgin House.

use of electricity during occupancy and, what is even more significant, encourage extended periods of occupancy by whatever means of ingenuity we can devise. An electrically-heated cottage is one of these means," he said.

Mr. Griffin said many people might ask why Hydro should serve uneconomic customers. The answer would be different for a private utility, whose responsibility was to make money.

"But as public corporations, we have an added purpose in this life. We must encourage the development of the country to be able to support a growing population."

Mr. Griffin said that development of recreational areas gradually produces development of commercial areas and, as population shifts with these influences, industrial areas are established.

He told delegates that the job of providing the power to the region was a challenge and every effort had to be made to maximize load factors to increase revenues rather than opt for higher rates.

"We know that we cannot be 100 per cent successful. Unfortunately, rates still rise. But unless we do all we can, and you do all you can, the increases will be even greater."

district

9

Full-scale marketing seen resuming in U.S.

Despite cutbacks in U.S. promotion programs for environmental and other reasons, "marketing is by no means at an end," Stewart Morin, a U.S. utility executive, told District 9 of the OMEA at Thessalon.

Mr. Morin, corporate secretary of Edison Sault Electric Limited of Sault Ste. Marie, Mich., said that "once things settle down U.S. utilities plan to resume full-scale marketing promotion.

"I think in this day and age we have to promote . . . you have to advertise . . . and you have to sell your product," he said. Utilities also must educate customers in the use of electricity for new applications.

He said the four major factors affecting the marketing scene in the U.S. are the

availability of generating capacity to meet demands, environmental pressures, regulatory controls and the need for cost-cutting to fight inflation.

Discussing the consumer view of U.S. investor-owned utilities, he cited a recent national survey which showed that 88 per cent thought that electric service was dependable compared with 95 per cent several years ago. Use of more electric power for environmental purposes such as sewage treatment and urban transit gained support from 46 per cent. Only 4 per cent favored a reduction in electricity use.

When asked if advertising should be restricted, 82 per cent said "no," 13 per cent "yes" and 5 per cent gave no opinion.

Mr. Morin said regulatory restrictions on U.S. utilities may be tightened because of the 90-day wage-price freeze imposed by President Nixon, which may be extended. "We feel we will be subject to more controls," he said.

He said state agencies might use requests for rate increases as a lever to force U.S. utilities to restrict marketing programs at a time when they are facing rising costs for environmental purposes. □

Question legality of gas clause

The Northland Municipal Electric Association has questioned a clause in North Bay property sales contracts which excludes all forms of energy but natural gas except for lighting.

The District 9 meeting passed a resolution asking Ontario Hydro to seek a court ruling on the legality of the clause "which appears to be a restrictive trade practice."

The clause states that only natural gas can be used in buildings erected on such properties for heating, cooking and other purposes except lighting.

Delegates charged that the gas company was putting up funds for essential services in return for the restrictive clause.

In discussion, Chairman George Gathercole pointed out that Hydro guarantees bank loans for all-electric homes but does not have funds to pour into services like roads, water or sewage lines.

Mr. Gathercole said the Ontario Advisory Committee on Energy will be looking into such matters and said he favored further studies.

He said in some cases it might become uneconomic to install an electrical distribution system in a subdivision which restricts use of electricity to lighting. Such a distribution system, he said, would in fact be subsidized by other power users.

Delegates carried a Sudbury Hydro resolution calling for negotiations with appro-

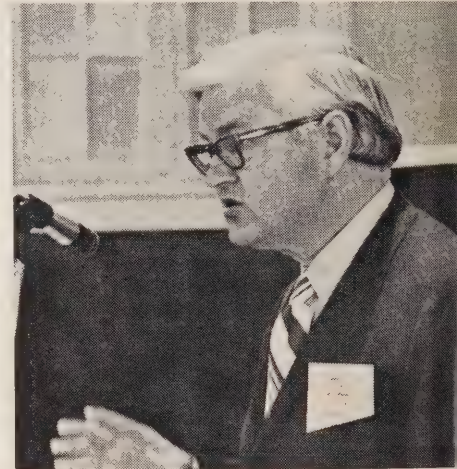
district 9



OMEA District 9 officers elected at Thessalon include, front row: Ron Duncan, Coniston, secretary-treasurer; Victor Gardi, Sault Ste. Marie, second vice-president; Roland Marleau, Sturgeon Falls, president; B. H. McPhail, Capreol, first vice-president; K. R. Rothen, Cochran, third vice-president. Back row: Joseph Bloemmen, Coniston; R. S. McKay, Thessalon; W. E. Edwards, Sudbury, past president; Raouel Vaillancourt, Hearst; Jess Goodman, Espanola.



W. E. Edwards, Sudbury, chaired the conference.



Stewart Morin, of Edison Sault Electric Limited, Sault Ste. Marie, Mich., makes point on utility marketing in the U.S.



Delegates ponder one of five resolutions carried by the conference.

ate government bodies for adoption of Canadian Standards Association standards for electric heating insulation throughout Ontario and for inspection of all residential construction by a single provincial regulatory body. It pointed out that inadequately insulated electrically-heated homes led to customer complaints.

Don Ireland, assistant general manager, regions and marketing, said Hydro is seeking uniform provincial standards of insulation but it was indicated they would be less than those required for electric heating.

District 9 also approved resolutions: Calling for the setting up of a co-operative contingency fund to assist municipalities which suffer extensive damage in natural disasters such as earthquakes and storms;

Asking the OMEA to request the Ontario Department of Transport to allow the full amount of legal fees associated with obtaining a settlement from the Motor Vehicle Accident Claims fund in cases where Hydro poles are knocked down by vehicles;

Asking that linemen re-training courses in Orangeville be scheduled earlier so that smaller utilities will not be left short-handed during busy periods. □

Cable TV potential seen wide-ranging

Cable TV will develop into "a new dimension in domestic communications" which may include remote meter reading, a CATV executive told delegates.

G. D. Zimmerman, president of IWC Industries Ltd., Malton, said the piping in TV programs will likely play a minor role in the future of cable TV.

He foresaw its use for bank, home and business surveillance, banking, shopping, education and medical care. He said Toronto teaching hospitals now using cable will be interconnected and eventually other hospitals will be linked by cable. Mr. Zimmerman, who said Canada is a world leader in coaxial cable development, appealed to utilities for access at reasonable cost to PUC facilities to provide a "highly desirable service" to a community. He conceded that at the moment cable TV is not essential in the same sense as radio or telephone, but predicted that "the potential element of cable TV is just around the corner."

He said cable TV offers PUCs a new communication link with customers. Common use of rights-of-way makes "good sense," he said.

During a question period, OMEA president Andrew Frame said the question will eventually have to be faced whether cable

TV will be controlled by private or public enterprise.

Mr. Zimmerman said cable TV was a rapidly developing, risky business which could be best left to private industry.

He told a delegate that the annual charge of \$3 a pole for joint use of Hydro facilities was reasonable.

Progress in developing remote meter reading in the U.S. was outlined by Donald W. Prendergast, of Canadian Westinghouse, who said he felt the technique was "a long way off in Canada."

He said remote meter reading was developing across the border in response to social and racial tensions in large U.S. cities. Meter reading costs were soaring in ghetto areas and, in one case, a meter reader had been killed on his rounds.

Mr. Prendergast said the same social pressures do not exist here but if costs are reduced by large-scale development in the U.S., Canadian utilities may find it's a possible way to save money on meter reading.

He said the main effort is to retain the highly reliable and accurate induction disk meter which has been in use for many years and to read meters from remote locations by use of telephone lines or radio.

One test installation in Houston, Texas, reads meters in a number of homes, relays information back to the utility computer and prints electric bills.

Westinghouse's first commercial effort is expected to be in service in a 250-unit apartment building in Raleigh, N.C. next year. Meters will be read at night over telephone lines without ringing the customer's phone. □

Provincial authorities seek to guide Hydro

People in authority don't want to undermine the role of electricity in Ontario but to give some direction to its development, said Hydro Chairman George Gathercole.

Mr. Gathercole said he had attended a meeting of the recently appointed Ontario Advisory Committee on Energy, of which he is a member, to discuss the role of electricity, natural gas, coal, oil and propane.

He said electric power has been the key to Ontario development and he hoped that through the advisory committee a better understanding will be achieved on the role of each type of energy.

He said brownouts and blackouts had occurred in New York City despite efforts to reduce power consumption. "It's very difficult to ration electricity except in wartime," he said. U.S. utilities have concluded that there is no substitute for an adequate supply of power.

Referring to Task Force Hydro, Mr. Gathercole said he thought it would be helpful in explaining and justifying Hydro policies, for example in marketing. "We believe we have very justifiable grounds for marketing to achieve economies of scale," he said.

He said inflation is still a problem but that electricity in Ontario will still be "a great bargain" in comparison with other utility systems. He said New York City residential customers were paying 3.86 mills per kilowatt-hour, compared with an average municipal rate of 1.28 mills in Ontario.

Mr. Gathercole announced that the second 540,000-kilowatt unit at Pickering nuclear power station had started up and the first unit had operated on a sustained basis for three months. "If its performance is as good as that of No. 1 unit, we are certainly going to be very pleased," he said.

He said power demands were slightly lower than anticipated this year but he expected demand will pick up in the balance of 1971. He said Hydro should be in a "strong reserve position" this winter, barring unforeseen contingencies.

Mr. Gathercole told delegates to District 3 of the OMEA at Thunder Bay that Hydro must be ready to adapt to change and be willing to find out where improvements are needed.

But, he said, Ontario Hydro and the associated municipal utilities have a right to defend a system which has withstood the test of time for more than 60 years and has become a model for other utilities in Canada and abroad. □

Environmental costs challenge to PUCs

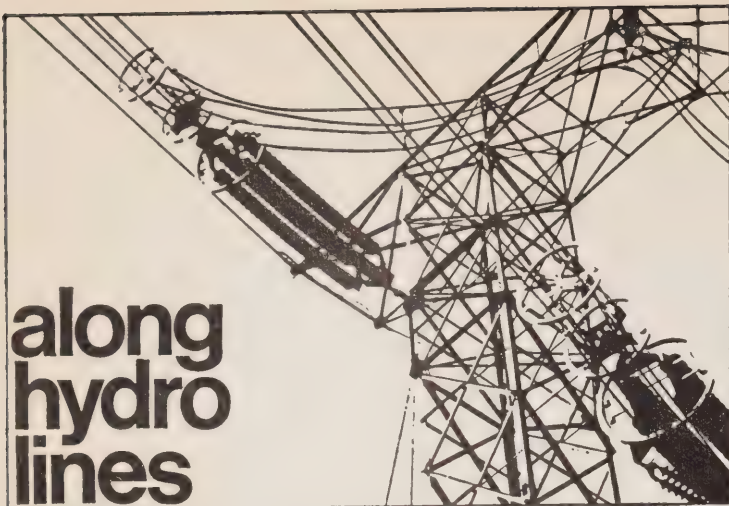
Municipal utilities are going through "trying times" of rising costs for items that don't produce revenue, W. E. Edwards of Sudbury, District 9 president, told delegates.

He pointed out that environmental control encompassed visual, sound and atmospheric aspects and, for example, transformers were required with reduced noise.

He said the public was demanding better service "and rightly so" and called for increased efficiency by municipal utilities.

"The challenge of this decade is to find the answers to the problems of increasing costs and to have the intestinal fortitude to do something about it," he said.

Other speakers included Andrew Frame, OMEA president; A. L. Furanna, AMEU president; R. H. Ramsay, general manager of Hyland Radio TV Limited, and Dr. Ray Effer, who outlined Ontario Hydro's environmental program. □



along hydro lines

New Hydro commissioners



L. E. Danis



R. N. Seguin

The provincial government has announced the appointment of two new Ontario Hydro commissioners. They are first vice-president of the Ontario Municipal Electric Association, Louis E. Danis, of Thunder Bay, and prominent Ottawa lawyer Roger N. Seguin, Q.C.

Mr. Danis, 53, chairman of Thunder Bay Hydro, was an elected member of the former Fort William Hydro for 11 years and served as its chairman. He was elected first vice-president of the OMEA last spring.

Mr. Danis currently holds a position in the Small Claims Court of the District of Thunder Bay.

Mr. Seguin, 58, graduated from the University of Ottawa in 1935 and received his law degree from the University of Montreal in 1938. He was appointed a Queen's Counsel in 1949 and has been active in community affairs in the nation's capital. He was awarded the Canada Medal in 1966. □

Pickering park

Ontario Hydro will build a 50-acre park on the northwest corner of its Pickering nuclear power plant property to provide a picnic and recreation area for members of the public.

In addition, a stretch of marshland next to the park will be retained for a bird and wildlife sanctuary as part of the Metropolitan Toronto and Region Conservation Authority's waterfront plan.

The approach to Pickering's powerhouse will be landscaped. All told, the beautification project will cost \$350,000, of which \$300,000 has been earmarked for park development. Close to 1,000 trees will be planted in the park area and picnic tables will be installed. □

Still a bargain

Ontario's electrical rates are still among the lowest in North America.

An analysis of typical residential electricity bills for last year in the United States and Ontario reveals that Ontario rates are lower than any state at the 250 kilowatt-hour consumption level, second only to the state of Washington in the 750 kwh range.

The U.S. average is \$7.51 as opposed to Ontario's \$4.68 in the lower category and \$14.22 compared to \$8.72 in the higher range. The state of Washington's average bill in the higher category was \$7.70.

The U.S. figures were contained in the Federal Power Commission's publication "Typical Electric Bills-1970." The Ontario comparisons were computed on a similar basis by Ontario Hydro statisticians.

Halt sought

The Ontario Municipal Association has supported the Association of Ontario Mayors and Reeves in its bid to have the provincial government halt further implementation of regional government pending a review of the four existing regional administrations.

At present, regional government has been implemented in Muskoka, Ottawa-Carleton, Niagara and York. The Mayors and Reeves Association feels the province may be "moving too fast" in the establishment of regional government.

In a statement to the OMA, Provincial Treasurer Darcy F. Keough, formerly Minister of Municipal Affairs, said regional development and planning is well behind schedule. There is a close relationship between regional planning and regional government.

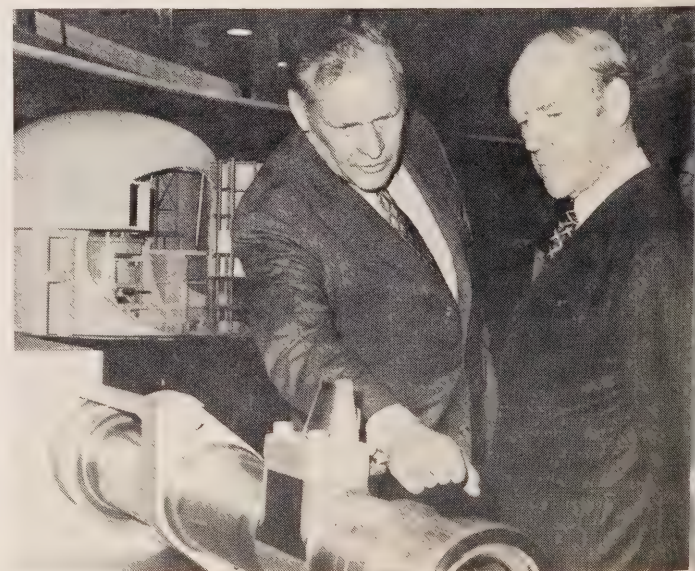
St. Catharines, a part of the Niagara regional municipality, recently advocated halting the introduction of regional government and the idea was endorsed by 11 cities, 39 towns, 50 townships, 11 counties and 10 villages.

The basic complaint was that regional government has produced inequities, duplication, and rapidly increasing civic costs.

Geneva atom talks

Mitchell Sharp, Canada's Minister of External Affairs (right), and Dr. A. M. Aikin, director of marketing for Atomic Energy of Canada Limited, discuss Canada's exhibit at last month's Geneva conference on the peaceful uses of atomic energy.

The conference, sponsored by the UN, featured practical examples of the benefits to be derived from the use of nuclear energy.



Nuclear wares on show

chnology and demonstrated the willingness of countries in possession of nuclear techniques to share their knowledge with countries less advanced in the field.

The Canadian system of generating nuclear power (CANDU) was discussed in papers presented by AECL and Ontario Hydro personnel.

Chicks the big draw



the CNE



new features at this year's Ontario Hydro exhibit in the Better Living Centre at the Canadian National Exhibition emphasized Hydro's efforts to reduce pollution and improve the visual environment.

But the kids seemed to best enjoy the section dealing with the controlled environment in which the hatching of baby chicks was the focal point.

Toronto Hydro had a display of its own depicting 60 years of activity. It was built by the faculty and students of Ryerson Polytechnical Institute. More than 35,000 people saw the exhibit, which featured replicas of electric living in 1911 together with a motion picture and slide presentation on the community then and now. Photos show part of the Ontario Hydro exhibit featuring demonstration of static electricity, and the Toronto Hydro display.

AECL declines bid

Atomic Energy of Canada Ltd. has declined an invitation to bid on a 300,000-kilowatt nuclear power plant for Yugoslavia. U.S., Soviet, and West German tenders were also invited.

An AECL official said the bid was declined because the Canadian and Slovenian state utilities wanted a turnkey bid on something that could not be supplied from Canada. The spokesman added: "There would have been financing problems in this." It's estimated that Canadian content in the proposed station would have been worth between \$50 and \$60 million. Initially, AECL had been holding talks with a consortium of Yugoslav companies with a view to bidding on the entire project, worth about \$200 million.

Seeking new site

Ontario Hydro has decided against building a transformer station on Beverley Street in downtown Toronto and will seek an alternative site.

Under a new proposal, Hydro will sell the site to the Ontario Housing Corporation for residential use. A station of the type proposed for Beverley Street is required to meet future power needs in downtown Toronto.

Acquisition of the block involved the purchase of 41 properties over a two-year period in an area designated on Toronto's official plan for institutional and government development.

However, Ontario Hydro recognized the growing concern for housing in the area, and the controversy which had developed over the project. The site was technically and economically acceptable to Hydro and was chosen only after an assessment of 10 sites in the district.

Hydro is now taking steps to acquire another site.

J-C Lessard dies

Jean-Claude Lessard, president of Hydro-Quebec from 1960 to 1969, has died at the age of 66.

Mr. Lessard graduated from Harvard University in 1928 with a master's degree in business administration. He spent 10 years in the economic section of CNR and in 1939 became a member of the Canadian Transportation Commission. He was appointed Deputy Minister of Transport in 1948 and later was named chairman of the Canadian Maritime Commission.

New line in lines

A new look in high-voltage transmission lines will be unveiled in the Toronto area next year.

Chosen as part of Ontario Hydro's program to make tower lines more acceptable to public tastes is the 16-mile stretch of right-of-way between Leaside and Cherrywood transformer stations.

At present, the right-of-way carries four single-circuit 230,000-volt lines, mostly through a developed urban area and bordered by residential and commercial subdivisions.

In the latter part of 1972, one of the existing tower lines will be replaced with a two-circuit line consisting of the new and more aesthetically designed steel pole construction.

The work will take about a year and the other three lines will be replaced with similar two-circuit construction over a period of several years.

A new-look line is also scheduled for the London area.

The painted, single-pole supports in the Leaside-Cherrywood project will bear little resemblance to the latticed towers — put there in the late 1920's — they are replacing.

The new towers, similar to the ones shown here, probably will be painted white and will consist of a single slim pole with a completely new design in cross-arms. The advantages are not all in the appearance. The new poles will use less right-of-way than the latticed type and are difficult for trespassers to climb. New work methods permit linemen to work aloft from an insulated bucket truck so there will be no need for climbing by maintenance men.



Slim look

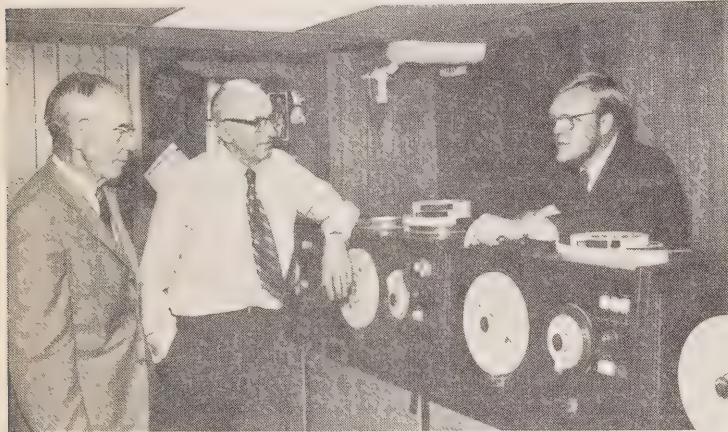
Another milestone

A full two weeks ahead of schedule, the reactor for the second unit at Pickering nuclear power station was started up last month. The sustained chain reaction means that within a few months another 540,000 kilowatts of electricity will be produced at Pickering.

Unit 1 was started up February 25 and synchronized to the provincial power grid on April 4. Full power was achieved May 30 and on July 29 it was officially declared in service. A similar commissioning period is anticipated for unit 2.

Work started on Pickering in 1965. It should be completed in another two years. □

PUC offers computer service



Looking for customers

When Oshawa PUC thought about establishing its own computer billing operation, the decision was not taken lightly.

After one year of computer billing with IBM on a contract basis, the utility decided in 1969 to lease its own equipment and a contract was signed with Honeywell Information Systems. The PUC began its own computer billing this summer.

With just 26,000 customers of their own, utility officials decided a more economic operation could be achieved if billing arrangements could be made with other utilities.

Three utilities are now taking advantage of the service — Barrie, Deep River and Bowmanville — and data processing supervisor Albert Dodds anticipates another six will join by the year-end.

And to make the service better known, the PUC invited 25 utilities to send representatives to a one-day meeting this month. London PUC has a similar billing service for utilities.

Mr. Dodds, on the right, discusses the computer operation with the utility's chairman, Ed Armstrong, left, and William Gibbie, secretary-treasurer. □

municipal briefs

Barrie PUC has set 1995 as target date to have its entire distribution system underground. Financial and feasibility studies will be undertaken to determine how the transition can be carried out. The city's mayor, Les Cooke, suggests the move is a "very difficult long-range undertaking which carries great financial difficulties which the utility cannot impose under the present system of municipal financing." But, he said, such a long-range plan fits the city's position of requesting massive transfer of funds from senior levels of government.

Deep River Hydro has signed a two-year agreement with its

employees calling for a wage increase of approximately 14 per cent. For the first time, the pact includes an employees' sick leave plan. The contract is retroactive to April 1, 1971.

Orangeville Hydro has a new manager. Bill Robbins, 11 years manager of Alliston PUC, has taken over from Carl Johnson, who retired at the end of last month. Mr. Robbins began his career at Alliston as superintendent in 1951.

Collingwood's first garage operator and automobile salesman Joseph Bull, has died at the age of 82. Mr. Bull served more than 20 years as a member of Collingwood PUC and was a former director of the Georgian Bay Municipal Electric Association. His first job when he moved to the town 64 years ago was in a bicycle repair shop.

A former Ontario Hydro line foreman, Morley Watson, who for the past year-and-a-half has been electrical superintendent and assistant manager of Bowmanville PUC, has been appointed as the utility's manager. Mr. Watson began his Ontario Hydro career in 1944. He later worked for the Township of Sandwich Hydro until its annexation by Windsor. From 1967 until his appointment at Bowmanville, Mr. Watson worked for an electrical contractor in southwestern Ontario, building lines for local utilities.

Nearly two million school book covers will be circulated this year by Ontario Hydro and the municipal electric utilities. Available in both English and French, the covers warn against everything from flying kites near overhead lines to inserting fingers and forks into toasters.

The man who built Canada's first all-electric incubator, and who retired in February as general manager of Kitchener PUC, Alf J. Thaler, has died at the age of 66. Mr. Thaler's career with the utility spanned 51 years. He started work at 16 as a bookkeeper, became general purchasing agent in 1938 and made it to the top — general manager — in 1965.

Cobalt-60 producer

The Nuclear Power Demonstration (NPD) plant at Rolphton will produce four million curies of radioactive cobalt-60 during the next four or five years, says the AECL annual report.

NPD will continue to produce 25,000 kilowatts of electricity for the provincial system. But to compensate for the loss of neutrons during the production of cobalt-60, the natural uranium fuel will be gradually replaced with slightly enriched uranium-235.

Cobalt-60, mainly used for cancer treatment, will also be produced at Pickering generating station.

Clean sweep

A flying vacuum cleaner is making regular trips across the North Sea to establish patterns of international air pollution. Scientists at the U.K.'s Warren Spring Laboratory are using a Hastings aircraft to gather air samples over the North Sea.

They hope to find out whether smoke and other discharges from British industry are "exported" to other European countries by prevailing winds across the British Isles. The work is aimed at establishing international standards in air pollution control.

The Hastings, which can fly at low speed and has plenty of cargo space, is regarded as an ideal machine for the job. Samples are taken on a 100-mile path at right angles to the wind at several levels between 500 and 5,000 feet.

Air is pumped from outside the aircraft through banked "bubblers" which absorb the impurities — particularly sulphur dioxide, one of the most common pollutants.

Warren Spring has used captive balloons to measure air pollution levels in Britain, fixing instruments to the balloon cables. But the flying vacuum cleaner is the only practical method of taking samples of any smoke plume drifting across the sea, say the scientists. □



as don wright sees it

One of the dilemmas facing the scientific community as we go to press is the degree of significance which should be attached to the difference in crocodilian nesting habits. In a nutshell, were the mound builders more advanced than the hole nesters?

One school of thought maintains that all lady crocodiles originally did their thing very primitively in a hole scooped out of the mud. But one group of crocs developed mound building habits and it was this group that gave rise to the alligatorines. Ipso facto, goes the reasoning, the mound builders are more advanced and the egg-in-a-hole crowd are a lot of dum-dums.

"From a behavioral point of view the differences between the two nest types are qualitatively important but quantitatively unimpressive," states one report on the controversial issue.

Personally, we are impressed neither quantitatively nor qualitatively. For all the evidence presently at hand some of these walking handbags may have laid their eggs in a hole in a mound.

■ Another thorny issue presently beguiling the people who care about such things is the case of the Neanderthal Man. Did he suffer from syphilis or rickets?

As we all know, old Neander was a species of Paleolithic man featured by an extremely dolichocephalic skull with projecting occiput, receding forehead and undeveloped chin. And while it is true that living replicas can be found today, especially among the engineering profession, Neanderthal Man, for the most part, huffed from the scene some 50,000 years ago. Whether or not he was plagued with an unbalanced diet or the consequences of unsound prophylactic practices will not be among the problems most of us would hoist to the top of the masthead in the uptight world of today.

■ Theoretical physicists have also been busy and one of the mysteries they've

been trying to penetrate is the black hole. So far, black holes of the kind they are concerned with are only theoretical but they are believed by many to actually exist in space. Becoming a black hole is one of the ways a star, of the celestial variety, can end its life. It is, in a sense, the corpse of a star.

Most of us will agree that, as the sources of thermonuclear energy are exhausted, a star, with a diameter of a few thousand to perhaps a million miles, suddenly collapses under the effect of its own gravitational pull. But we, for one, remain to be sold on the rest of the theory.

As the star shrinks, these birds postulate, it grows more and more dense and eventually condenses to a size only a few tens of miles in diameter, suffering a complete gravitational collapse. Because of its density, the compressed star distorts both the space and the time surrounding it.

From here on in, the theory gets a little complicated but as the author of one report makes very clear, a black hole full of distorted time and space is something we'd all be wise to approach with caution. In a brief deviation from his scientific jargon, he had this to say.

"If Alice had fallen into a black hole instead of the rabbit hole, the story would have ended right there. . . . Alice would have been torn apart by violent tidal forces. She, as with any matter that enters a black hole, would be reduced to mass, charge and momentum. . . . In a black hole it would be impossible to tell the dormouse from the mad hatter."

We have a suspicion that the author himself is the mad hatter and we would not have raised the subject at all except for a note of desperation which we detected near the end of the treatise.

"As one might expect of an object that neither emits nor reflects light," he laments, "finding a black hole will require some ingenuity . . . it will be unimaginably difficult."

Any of our readers who find, or even suspect, the presence of a black hole are urged to report same to the accident prevention people or any other authority skilled in sniffing out intangible hazards.

But do be careful — unless, of course, you don't mind being reduced to mass, charge and momentum.

■ Some pretty nutty things are being done in the interest of science, we'll have to admit, but it's comforting to know that it's been going on for a long time and we've managed to survive. Take that little scientific gem carried out by a French priest in the middle of the eighteenth century to prove that the transmission of electricity was instantaneous.

This good man of the cloth assembled 900 monks and linked them together in a circuit some 6,000 feet long by means of short lengths of iron which they held in their hands. He then had the first and last men touch two terminals on a well-charged and newly-invented Leyden jar.

The priest was pleased to record that everybody felt the shock equally and simultaneously — "as proven by the fact that all 900 men leaped into the air together."

And what a height — 1,800 feet up in the air.

■ And toward the end of the last century a German physiologist laid the groundwork for the telegraphic tadpole. This man of science placed a number of tadpoles in a basin of water and submitted them to the action of the current from a small electric battery. He found that they acted like magnetized needles in that they exhibited decided polarity. Their heads would all point toward one of the wires until the current was reversed, at which time they would swing around in unison and point the other way.

And what conclusion did this fellow draw? Simply that, in his own words, "a telegraphic message could be deciphered through the medium of living tadpoles in lieu of magnetized needles."

Even if he is right, it is doubtful the tadpoles could stand the gaff — much like watching a ping-pong match without any ending.

■ It's refreshing after pondering all this esoteric and weighty matter to pick up a homey little pamphlet put out by a Canadian utility and covering a variety of topics from the generation of power to local Indian legend. Included is some topical and very helpful advice from the home economist for anyone with pickle problems. Among the maladies she suggests how to cure are hollowness, softness, slipperiness, color and texture. The use of alum to increase crispness is discouraged and we are warned that too strong a brine will cause the pickle to shrivel. Too weak a solution, on the other hand, results in soft and slippery pickles.

■ And a strange report has come to our attention from a town not far from here concerning the dismissal of two teenaged "meter-maids." According to newspaper reports, the girls had been the subject of appreciative looks and wolf whistles from male motorists and they were let go because they were "too pretty."

If good looks were grounds for dismissal, we'd have been out years ago.



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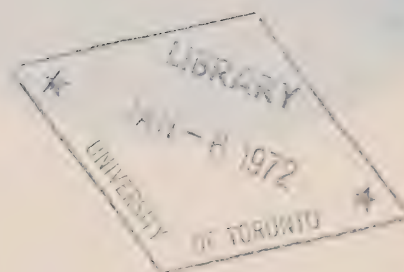
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ontario hydro news

november 1971

new hope for algae





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the cover

Believe it or not these intricate shapes, some of them almost jewel-like, are what you see when a little green scum from the surface of a pond is placed under the microscope. In fact, algae are basic to the food chain. Without their myriad forms, it's highly unlikely any of us would be around to read the article appearing on page 6.

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Viewpoint

Power costs

The recent decision by Hydro to defer expected rate increases was made in the light of the many economic uncertainties which presently exist. At a time when governments at all levels are striving to alleviate unemployment and stimulate an economy which has been adversely affected by a variety of factors, it was deemed undesirable to increase rates for such an essential commodity as electricity.

The shortfall in revenue brought about by this deferment will be met, in part, from the Rate Stabilization Reserve. This reserve is maintained to cushion the impact of a variety of contingencies including exceptionally adverse economic conditions.

The deferment does not reflect any change in the long-term outlook. There has been little or no abatement in the upward pressure on the cost of power - a trend which Hydro has forecast will continue for several years. More and more of the province's electrical requirements are being met by thermal-electric generation and the price of fuel is climbing. Wages and material costs are still moving upward while the anti-pollution program continues to grow more costly.

High interest rates stand out among the factors contributing to the rising cost of power and the amount of capital Hydro must raise is at record levels.

Inflation is undoubtedly the biggest single factor mitigating against any downturn in the cost trend. Interest rates are geared to inflation because investors try to offset its effects by demanding higher returns on their capital. Only by damping inflation and the expectation of inflation is the price of credit likely to fall substantially.

Even if the country is successful in combatting this process of monetary erosion, Hydro cannot avoid a long period of high interest charges because of the long-term nature of its financial commitments.

Ultimately, for financial viability, revenues must be adjusted to equate with costs. Some hold that Hydro should meet a much higher percentage of its capital requirements from revenue than has been its practice in the past.

They feel that such a policy would have a salutary effect on rates over the long run by stabilizing or reducing capital debt, and thus alleviating the pressure of interest charges on costs. The short and medium-term effect would be substantially higher rates - something to think about at a time when other cost factors are rising so rapidly.

The availability of capital in the amounts Hydro will require in the future is another consideration which could influence the extent to which costs are met with current revenue.

There are a number of areas over which Hydro can exercise control as these are being diligently exploited to help offset rising costs. New and advanced budget techniques have been introduced, automation and the use of data processing methods are being extended and full advantage is being taken of economies of scale in system planning.

Other aspects of the operation contributing to savings through increased efficiency include research, manpower planning, staff development, purchasing and communications.

The financial aspect of the Hydro operation is complex and immense. Every effort is made to ensure that policies and practices are sound and in the best interests of the power users of the province. □

fishing for answers



Slowly, the fishing fleet that once sailed from Port Dover at the eastern end of Lake Erie has dwindled. The men whose livelihood depends upon the rich harvest of smelt, perch, yellow pickerel and white bass have moved further afield in Erie in search of better yields.

But a rust-colored, all-steel, 42-footer called the David M has steered a course in reverse and docks regularly at the government wharf inside Port Dover harbor.

Every morning about seven, John Kelso, a fisheries biologist with the Department of Lands and Forests, and three of his assistants set sail in search of smallmouth black bass, and pickerel, and pike, and perch, and catfish, and whatever else happens into their eight or 12-foot trap nets.

They're not fishing for the sport of it, nor for profit. They're fishing for answers. They want to know the status of the lake now,

and ultimately whether warm water discharged into a lake the size of Erie has any effect on fish life.

So does Ontario Hydro. Indeed, the work being done by Dr. John Kelso is part of an intensive study off the hamlet of Nanticoke by the Ontario Water Resources Commission, the research branch of the Department of Lands and Forests, and Hydro. Nanticoke has sprung into prominence for industrial development since a start was made here on a 4,000,000-kilowatt coal-fired generating station.

An unusual calm had settled over Lake Erie on this particular day as the David M, churned out of St. Williams harbor. Its captain, Max Harris, is a fisherman in temporary retirement after more than a quarter-century "because of the mercury levels found in fish in the western basin of the lake." The water's glass-like surface

was disturbed only by the boat's prop as the research team set sail to check trap nets that had been in position for a couple of days.

En route, the crew were busy positioning a plank with a pulley on one end across the deck. Endless coils of rope were reeled in to haul in the heavy net. The catch turned out to be one of the best yet. In the net were 831 fish ranging from smallmouth bass to channel cat and bowfin.

Then began the tedious task of measuring, tagging and returning all fish to their natural surroundings. (Live returns governed the choice of trap nets over all other types of fishing gear.) The entire operation lasted about an hour and a half and, when some fair-sized smallmouth were being tossed back into the water, just off to a sports fisherman in a cream-colored outboard gazed on in awe.

by Rae Hopkins

Every morning, the David M sails from Port Dover to clear nets set a couple of days before.



by the fish-tagging? Dr. Kelso explains
s trying to establish migration patterns,
d between now and when the project
nds up in 1974 he'll table the results from
sampling stations dotted along a grid
atching between Miller Point and the
of Long Point.

th a tow net that measures a metre in
umference at the hoop and has a plastic
tle attached to the end, Dr. Kelso's
m also collects a variety of samples
ging from fish hatched in the spring to
erent species of zooplankton.

ws are a standard five minutes in dura-
n at a constant speed for "absolute
sity" sampling. "We drag the tow net
n attempt to assess the areas of success-
spawning. And we're able to judge the
ding habits of the various fish species
comparison of stomach contents to
anisms we catch in the tow net," says

*shore studies are being conducted in the vicinity of the 4,000,000-kilowatt Nanticoke generating
ion. They're part of an intensive research program involving Hydro, private industry and
ernment agencies.*

Dr. Kelso as he grips his briar between his
teeth (he's already bitten a hole in the
stem).

Dr. Kelso's work is part of a program of
intensive lake studies in which Ontario
Hydro and its neighbors Stelco and Texaco
are co-operating with the Ontario Water
Resources Commission and the research
and fish and wildlife branches of the De-
partment of Lands and Forests. The latter
agency has received a \$200,000 grant from
Hydro, Stelco and Texaco for its work in
temperature, fish, and zooplankton studies.

Investigations will take into consideration
phytoplankton — microscopic plants which
float freely in the upper levels of the lake
and convert the sun's energy into a source
of food (through the process of photo-
synthesis) using dissolved carbon dioxide
and hydrogen from the water.
Phytoplankton are eaten largely by zoo-
plankton, or free-moving microscopic

animals. Zooplankton then may become
the food source of bottom-living organisms
such as the larvae of mayfly and caddisfly,
crustaceans and snails, or plankton-eating
fishes, all of which in turn are consumed
by other fish.

Many types of organisms are present at
each feeding level and these consume or
are consumed in a variety of ways, the re-
sult being a food web. If one species is
reduced or increased in number, changes
in the levels of other components of the
food web may occur in an attempt to com-
pensate. When an extreme imbalance takes
place, the web may become upset and a
deterioration of the biota results.

Naturally-occurring temperature fluctua-
tions along the shoreline of the Great Lakes
indicate that fish are normally capable of
tolerating a wide range in temperature.
Dr. Kelso's study will determine whether
man-made temperature modifications,



superimposed on the naturally-occurring fluctuations, will have an effect on fish populations.

To this end, the David M keeps a constant check on lake temperatures. With the Nanticoke plant as a backdrop, the craft pulls alongside a red and orange buoy three miles offshore and the trap net boat bobs lazily on its own swells. A University of Western Ontario student, Jim Lipsit, attired in his wetsuit, slips quietly over the side holding three steel-sheathed cables suspended from a recorder that's just been mounted atop the buoy.

One cable he places at one metre depth, the second at mid-water and the third about a metre from the bottom. The devices will record all temperature fluctuations over a seven-day period. Two other recording stations are placed on the periphery of the projected warm water plume stemming from the plant's outflow.

"Specific areas for study were chosen which are going to reflect the situation now, before there's any heat input into the lake," says Dr. Kelso. "This project will assess the growth rate of fish, their mortality rate, their feeding patterns and the relative species composition for this area of the lake.

"Matter of fact, if our field examinations indicate that each species is localized, we can probably go to absolute numbers and have a pretty accurate fish count within the gridded area."

A 52-foot house trailer within a stone's throw of the David M's mooring place has been set up as headquarters for Dr. Kelso's team. From the outside it resembles anything but a research laboratory. Inside, it's compact and equipped with everything that's needed for intensive investigations. For example, there's a press for making

scale impression slides — from the fish samples collected every time the nets emptied — and a projector to magnify microscopic scale markings and thus determine the age and growth of the fish.

And there are jars and jars of samples taken in seine nets along the shoreline to determine the kind of small fish in the area, movements, and their population structure by species.

Three students supplemented the operations of the David M and its crew all summer long, working in the laboratory. In addition to their shoreline seining activities, the students examined sample catches of both sport and commercial fishermen and conducted interviews among the Lake Erie fishing community.



th groups of fishermen provided invaluable information by submitting tags and reporting success.

the other end of the laboratory, there's an office with two walls converted into lockers. When actual collections in the lake are completed for the day, John Kelso works long hours on his notes — and research papers that he's preparing for various scientific journals.

"We already know that some species thrive in warm water — others are not heat-tolerant. We're gearing our study mainly toward the sport and commercial species," he says. "Since April, we've marked and released close to 3,000 fish, in addition to many others which are simply examined and returned. We're trying to determine their movements and, in fact, see whether Long

Point is a natural barrier. If that's the case, we should be able to determine the number of fish that are in the study area.

"When spawning comes, we'll be sacrificing a limited number of fish to assess the reproductive potential of species in the Nanticoke area. Really, all agencies involved in the work are trying to find out if there are changes in the biology or characteristics of the environment. Scientists in other localities have found alterations, in this case we are all involved in determining if there is or isn't a change, and if there is, what form — beneficial or adverse — does it take.

"All studies began before any warm water was released into the lake and will continue after Nanticoke generating station is in operation. With a complete field picture of

both the before and after effects, investigating agencies can come up with some intelligent ideas and recommendations to rectify the situation, if remedial measures are needed."

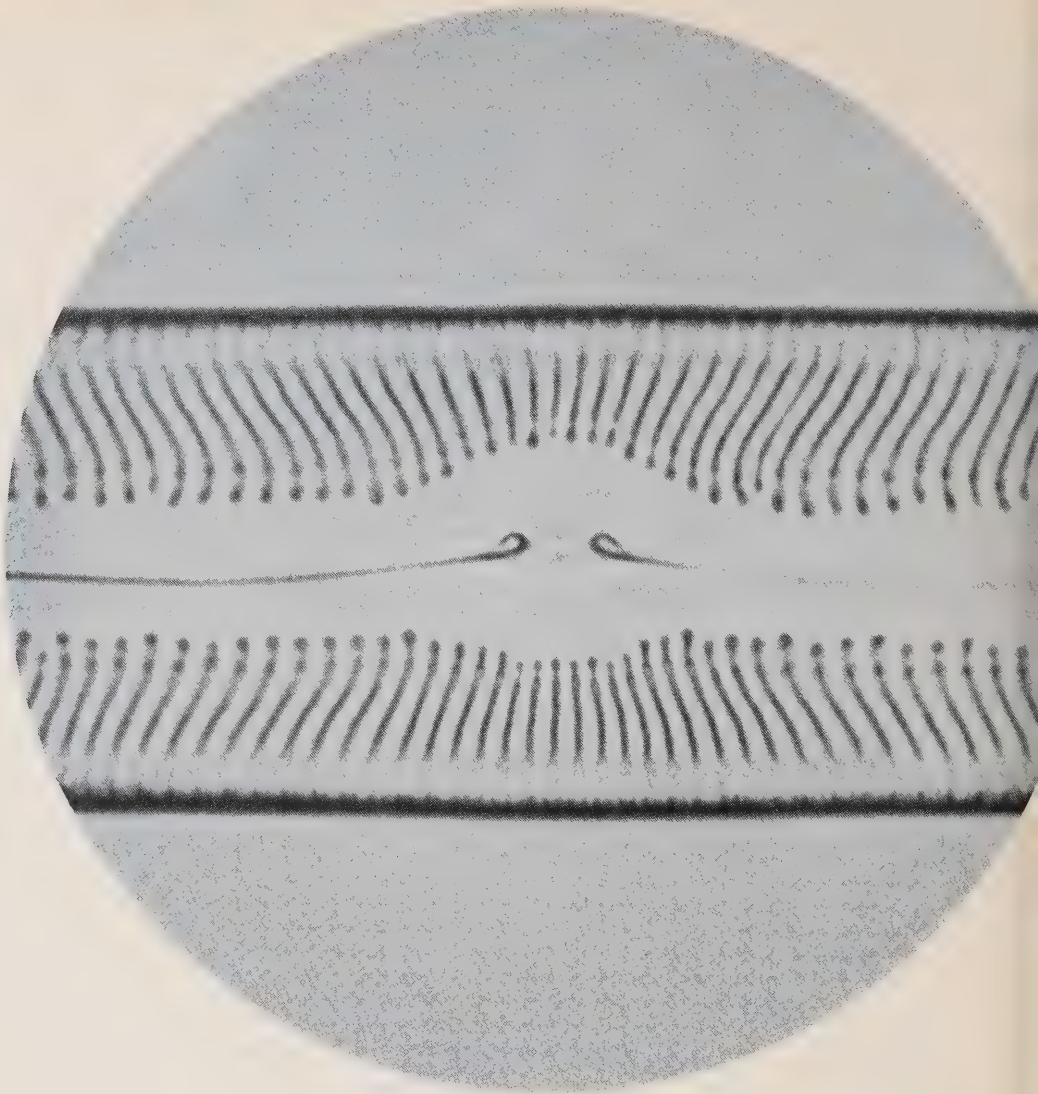
Whether they are or not, the crew of the *David M* will be among the first to know.

Trap nets, far left, are hauled aboard the David M and the catch measured and tagged before being returned to the lake. Tow net is used to collect samples ranging from fish hatched in the spring to different species of zooplankton. Below, Jim Lipsit and Dr. John Kelso, right, seal samples in plastic bag.



Another kind of grass

story and photos
by Jerome J. Knap



*All life on earth
may owe its
existence to the
lowly algae*

To most people, the word algae conjures up a vision of seaweed rotting on the beach after a storm. Only a few people know that these plants are the basic food for much of the animal life in our seas. Even fewer know that all life on earth may owe its existence to the lowly algae and that they perform a major role in maintaining the global circulation of atmospheric oxygen.

Certainly, algae have been around longer than any other organism. They've been found in fossil beds in Australia dating back more than three billion years.

Photosynthesis, the process which transfers the energy supplied by the sun, through the presence of chlorophyll, to potential energy stored in the form of carbohydrates, first evolved in the algae. Since photosynthesis gives off oxygen as a byproduct, the algae slowly began to change the atmosphere of the earth by releasing free

oxygen into it. Until this time, no gaseous oxygen existed. This paved the way for the evolution of oxygen-using organisms, including man.

Algae are not limited to salt water, as everyone who lives near Lake Erie knows. The green scum of many small ponds is simply an accumulation of algae. And not all algae are aquatic. Some are found in moist soil, on tree trunks, a few are parasitic, and a few even combine with fungi to form lichens.

The simplest algae are unicellular. More advanced forms consist of a simplified structure called a thallus. The most advanced forms have structures similar in outward appearance to the root, stem and leaves of higher plants.

Their size and mode of life is variable. Some algae, like the diatoms, are single-celled and microscopic. The biggest of these is the species *Coscinodiscus rex*,

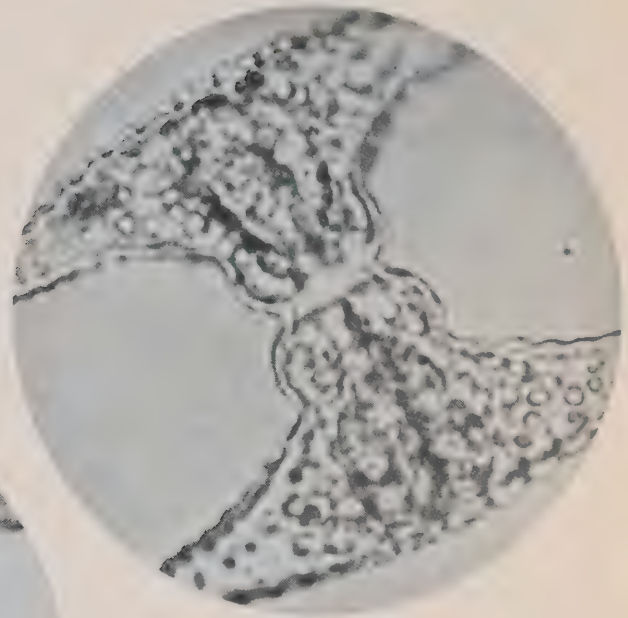
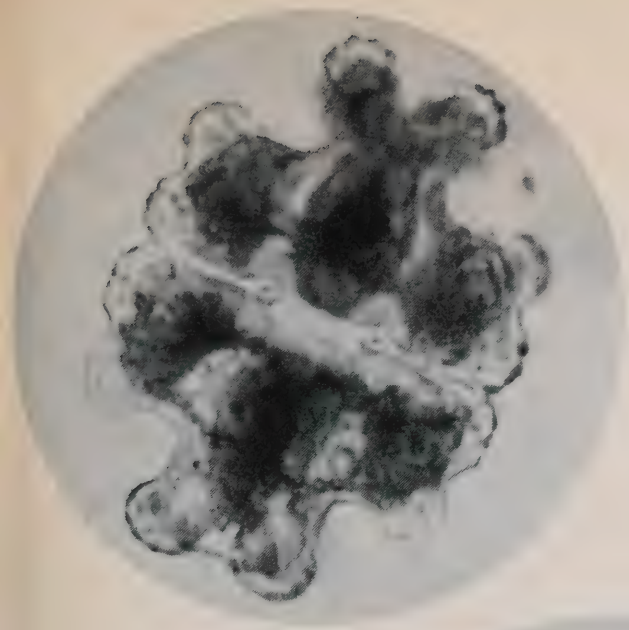
about the size of a pin head. Yet their shapes and colors make them little jewels of the plant world. Some algae are colorless, forming strings and clusters. Others, like the dinoflagellates, are motile and move about by means of hair-like structures called flagellae.

Many algae spend their lives attached to rocks and other solid objects. The largest of these is the giant kelp, *Macrocystis*, whose fronds sometimes reach 600 feet in length. Some algae such as the gulfweed, *Sargassum*, float about. Indeed, the Sargasso Sea, an area larger than Southern Ontario, is named for the presence of great masses of these floating gulfweeds.

To date, over 25,000 species of algae have been described and given scientific names.

It is the thousands of small species that float about at the mercy of the tides, currents, winds and waves that hold per-

Myriad shapes of freshwater algae are well illustrated by these microscopic specimens, thousands of times enlarged. From left, genus *Pennularia*, a diatom; *Euastrum*, a green desmid; *Spirulina*, a form of blue-green algae, and *Staurastrum*, also a green desmid.



the greatest interest for the biologist. They are collectively known as phytoplankton, and are the primary producers – the grass – of our waters. Through photosynthesis and nutrient uptake from the water, these tiny plants produce carbohydrates. It is on these phytoplankton that the tiny animals, the zooplankton, feed. The zooplankton, in turn, are eaten by larger zooplankton or the young of many other aquatic creatures, including fish.

In addition to their extremely important role as primary producers, the algae are vital in other ways to the ecology of our waters. As a byproduct of photosynthesis, the algae release oxygen and thus aerate the waters for other organisms which require oxygen for respiration. The large algae also provide protection and shelter for myriads of small marine animals, as well as breeding grounds where eggs may be laid and where the young can hatch and grow in relative safety.

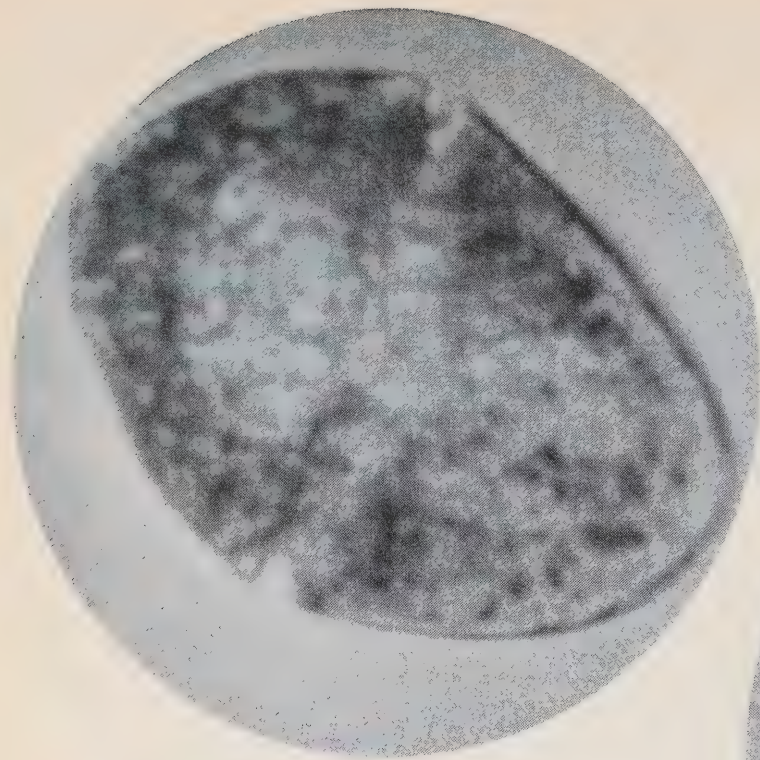
Forms of blue-green algae have the capacity to fix atmospheric nitrogen, an important factor controlling fertility in wet soils.

Many species of algae have been used directly by man. Probably the earliest use was for food. The eating of algae has largely died out in the western world, but it still prevails in the Orient, Ireland and in Hawaii. In Japan, the alga *Porphyra* is extensively cultivated and many other species are gathered from the sea. In Hawaii, over 40 species of algae are eaten.

Indeed, with a rising world population putting pressure on food supplies, algologists and marine biologists are closely looking at algae as a source of food. It has been calculated that 3.2 tons of dry plankton are produced by one acre of sea water per year. Much of this plankton is composed of algae. Another alga being investigated as a food source is *Chlorella*, which

contains high amounts of protein. It is possible to grow 17 tons of dry *Chlorella* per acre. No crop on farm land can match it. Algae have other uses for man. At one time, the giant kelps were an important source of potash. They were also the only source of iodine, which is still extracted from them. But today, the kelps are primarily a source of alginates which are used by a number of industries ranging from artificial fibres to pharmaceuticals and cosmetics, as well as stabilizers in ice cream and canned soups. Algae are also used in the production of agar-agar, a material which has a wide variety of uses from the culture of bacteria for medical research to the production of paper, glue, leather, cosmetics, and the canning of fish.

We even use deposits of fossil algae, which are known as Fuller's earth or diatomaceous earth, in making prints, refining sugar,



filtering water supplies and insulating blast furnaces in steel mills.

Unfortunately, algae also have their dark side. In thermal-electric power stations, algae grow on the inner surfaces of the brass cooling tubes which form part of the steam condensers. Although this film of algae is quite thin, it acts as an insulator, impeding the transfer of heat and reducing station efficiency.

To combat this, Ontario Hydro follows a standard procedure of adding chlorine to the water in these pipes every eight hours. Chlorine kills off algae, which is one of the reasons it is added to water for human consumption.

Ontario Hydro experiences another problem at its thermal stations, too, where masses of the alga *Chlamydomonas* clog the cooling water intake screens and have to be periodically cleared.

Some algae exude byproducts which im-

part disagreeable tastes and odors to water. Others smell "fishy" when they die and decompose. In lakes or reservoirs used for domestic water supplies, this can be a problem, even rendering the water unfit. In other places, algae can ruin recreational sites because of their odor and dense, matted growths. Boating, swimming and fishing have all, at times, been ruined by algae. But, usually, when algae grow in such abundance, the water is already polluted by too much nitrogen and phosphorus.

Algae can also kill fish and shellfish. The infamous "red tide" caused by several algae of the genus *Gymnodinium* releases poisons that can kill schools of fish. A particularly widespread "red tide" killed hundreds of tons of fish off the Florida coast this past summer. Beaches had to be closed because of the rotting fish.

Yet, algae may become important in com-

batting one of modern man's worst problems — pollution.

Their use for the treatment of sewage recently come into prominence. The current biological treatment of sewage is essentially a process of oxidation, the organic matter being broken down by bacteria using atmospheric oxygen. The oxygen is supplied by either spraying the sewage into the air or by blowing air into the sewage. This process is expensive both in installation and in operation.

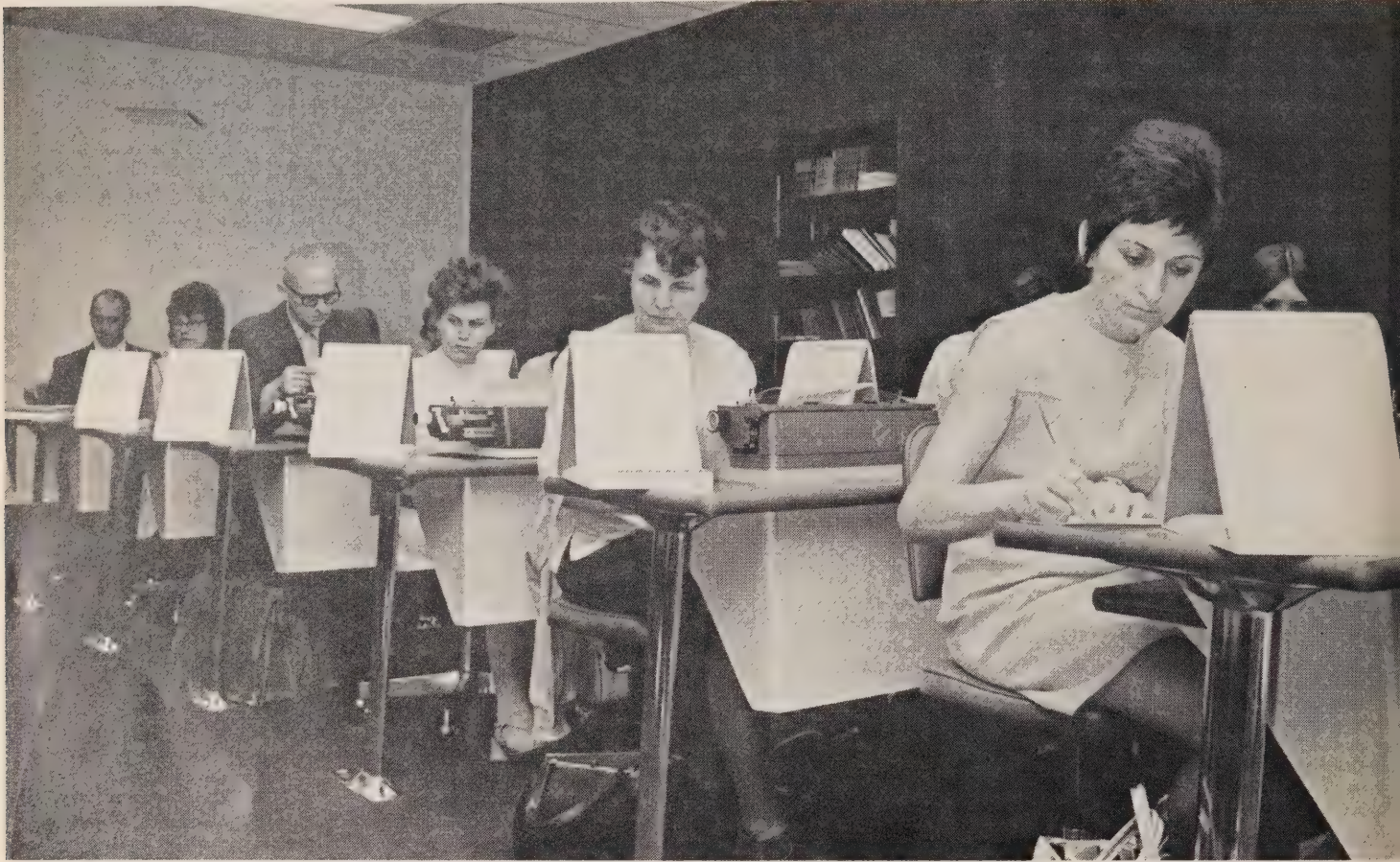
Another way to get oxygen into sewage water so that the bacteria can break down organic matter is by growing algae in sewage lagoons. Initial experiments in California have shown this to be feasible. Thus, besides being indispensable in ecological cycles of our waters, this numerous and intriguing group of plants may play a vital role in helping to clean the environment. □

: genus *Gymnodinium*, a pigmented flagellate,
Zygnema, a green filamentous alga. Below :
ore usual view of algae floating as scum on the
face of a pond.



No beating about the bush

Not at Confederation College. Rather, many of its graduates and teachers are headed straight for the northern wilderness.



A single-engine aircraft touches down on a lake near a remote Indian village in North-western Ontario and taxis up to the dock.

A passenger alights carrying an attache case in one hand and a valise in the other. The pilot begins passing out the heavy luggage. There are suitcases crammed with books, pencils, scratchpads, and thermal underwear. A crate is filled with scrap fur. They'll all be needed for the long northern winter that lies ahead.

The passenger's a member of the faculty of Thunder Bay's Confederation College of Applied Arts and Technology, and he's going to spend the term among the Indians. He plans to teach everything from elementary reading of the "Peter, John and Mary" textbook variety to producing usable pelts from the scrap fur he's brought along.

It's like bringing the mountain to Mohammed.

And it's a far cry from the all-electric climate-controlled atmosphere of the main campus on which he spent the last semester.

But that's what Confederation College is all about. It's a college for the northland — and it reaches out far beyond the campus confines to educate the people.

Embodying the community college concept, Confederation College goes further than most in innovation and flexibility to meet the educational needs of the community at a post-secondary school but non-university level. In addition to Thunder Bay, the college serves 38 different centres across an area the size of France.

Some of the most varied courses are offered by the college's applied arts and technology department, where students can embark on careers ranging from radio and television arts to that of an education worker in Indian communities. Enrolment averages about 800 students a year. Close to 2,000 adults a year pass through Confederation College's retraining program and there are always about 300 enrolled in the school's extension department.

The college recognizes that the Northwest is unique for the tradesman. For example,

the technology department has initiated a course tailored to measure for the numerous "bush" airlines operating in the area.

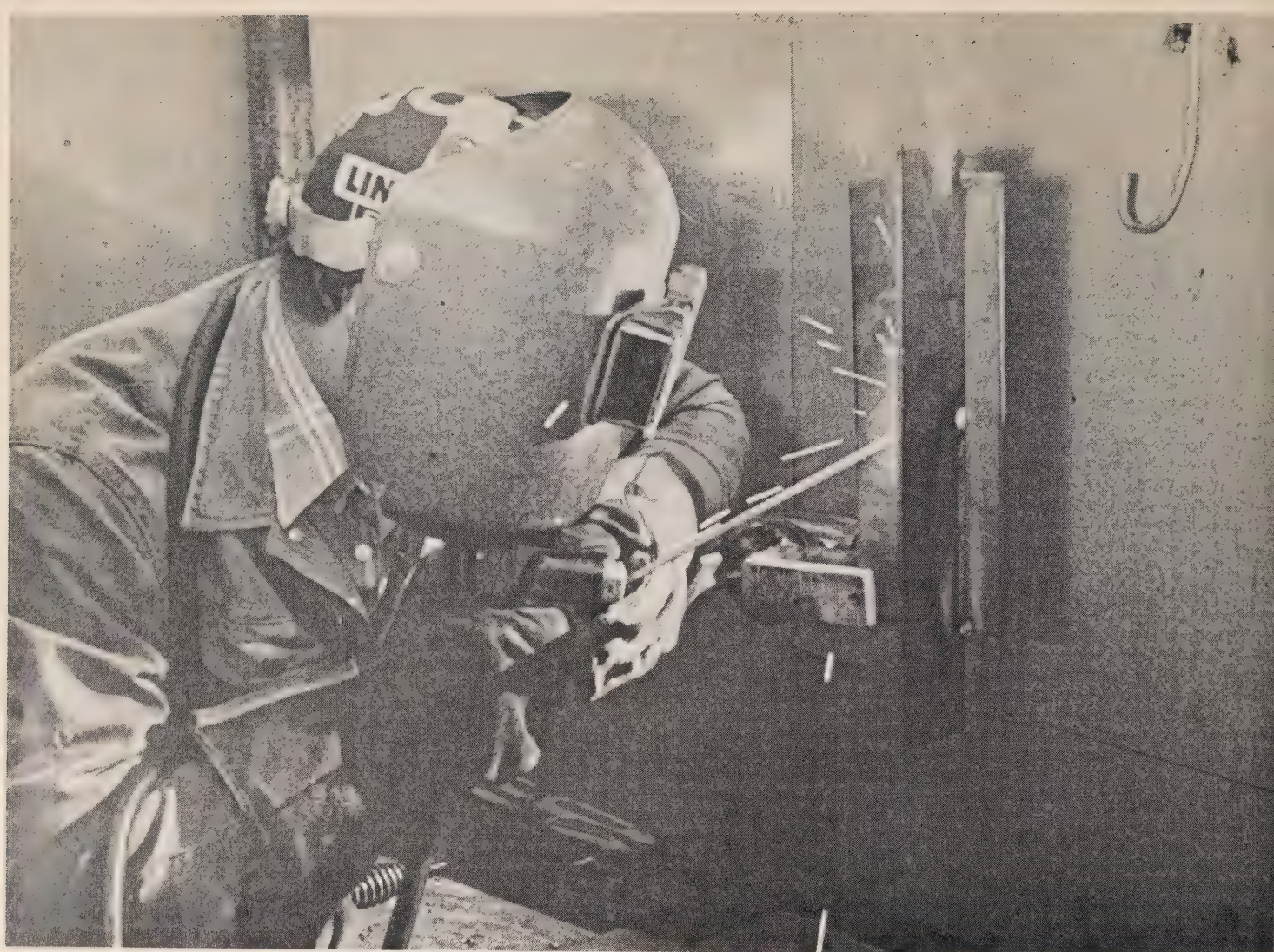
Says the calendar: "Aircraft used in Northwestern Ontario range from Supercub and Cessna 180 to Beechcraft 18 (twin engine). These aircraft operate extensively on skis, wheels and floats. At present, a very definite need exists for maintenance personnel for this type of aircraft. The need is particularly acute in the area, whose vastness coupled with the remoteness of its communities makes air travel the true line of the north."

Planes are used in a wide variety of operations in the Northland, from fire suppression to transportation of food and supplies in the more isolated districts. According to an Ontario Department of Labor survey, about 59 per cent of the air service industry in the province has a shortage of aircraft maintenance engineers.

Because of the nature of northern air operations, a prerequisite for admission to the course is a student's love of the outdoors.

urses at Confederation College range from bookkeeping and typing
keeping bush aircraft flightworthy. While most classes are held
the all-electric Shuniah Building, others are far removed from the main
mpus. Bottom left: college president Air Vice-Marshal D. A. R. Bradshaw.





doors and an ability to work with a minimum of equipment at his disposal. So he's put to the test during his first summer spending 15 weeks in a remote location keeping aircraft flightworthy.

Other departments offer band management courses for Indian students, and elementary English classes for new Canadians, and typing, and stenographic training, and letter writing. The list goes on and on, and even includes on-the-spot training in a welding shop a few miles from the Thunder Bay campus.

They take educational programs into the Kenora and Rainy River districts, too. But wherever they go, the emphasis is on teaching people to help themselves. For example, teachers spend hour after long hour with Indian hunting and fishing guides to help them deal more effectively with the tourist trade.

And with scrap fur they teach Indians how to match head, back and front paw and tail skins to produce mink pelts that, when made into a coat, would retail for something like \$800 to \$1,000 as compared to a top-line garment made only of back pelts that would cost anywhere from \$4,000 to \$14,000.

Ian Clark, Confederation College's director of property and plant, puts it this way: "We try to help them to help themselves. We try to encourage them to get their own business going. Most of all, we try to halt the doling out of welfare, for we strive for independence among our students, particularly our Indians."

College president Air Vice-Marshal D. A. R. Bradshaw puts it another way: "The difficult we do immediately; the impossible takes a little longer."

Nestled amid tall poplars just off the main by-pass heading west out of Thunder Bay, Confederation College will eventually consist of a group of corridor-connected,

all-electric buildings. At present, the 100-acre campus consists of the Shuniah Building, which contains the Great Hall, classrooms, laboratories and workshops, a temporary classroom and office complex. The first stage of the permanent buildings will be finished next summer. Three other stages in the master development plan will be completed over the next decade. Because it has to cope with the long northern winters, the college's heating system was of vital importance. After a detailed evaluation of four feasible heating systems, says Mr. Clark, the college's consulting engineers came up with a strong recommendation for a total electric package.

Ontario Hydro's Northwestern Region consumer service and sales staff played a significant role in the design of the system, which has added about 2,500 kilowatts to Thunder Bay Hydro's load.



economics was a major reason for the choice. "It's more economical in terms of capital costs and in operating costs, too," says Mr. Clark. He suggests that because the all-electric system does not require an operating engineer on duty around the clock, the equivalent of four people's salaries is saved every year.

Another reason for going all-electric was that the control system takes up less space, and the same system cools as well as heats. "It's simple to operate and practically maintenance-free because it's reliable and clean. It operates quietly and there are no unsightly smokestacks or exposed fittings to detract visually from the surroundings," Mr. Clark adds.

And just to complete the scene a spring-fed stream cuts diagonally across the campus, somehow enhancing the tranquility of this college of the north.

Sometimes, Indians from Northwestern Ontario's remote communities move to Confederation College, where they learn skills such as welding or repair. But the faculty also travels into the wilderness, teaching such skills as the making of boots from scrap fur.



the stitchless society

by Sheila Kenyon



ultrasonic sewing machine, left, employs high-frequency sound waves to weld synthetic fibres. Manufacturers are using it to "sew" blankets, parachutes and some types of clothing. Below: Best Ontario styles were displayed at this year's Deedee Fashion Awards presentations at Ontario Place.



Webster's dictionary defines clothes in a very simple way — "covering for the human body." It says nothing about fashion. The description is hardly adequate, especially today when confusion reigns in clothing design and the retailer is left wondering what to stock next.

The hem line has shot up and down, hot pants and pant suits have eclipsed other forms of female attire. Jeans are outselling gabardine slacks and it's almost impossible to find a university student who owns a suit.

What does it all mean? Youth has been very quick in recent years to break with tradition and clothes express one's inner feelings. Down through history, clothing has been a status symbol — almost a uniform which categorizes a person and reflects the society from which he springs.

But the garment manufacturing industry is being affected not only by the mood of society. It is also feeling the impact of technological progress. We are entering a new phase of manufacturing and evolution in fabrics and machines that may gradually change the whole concept of dress and clothing as we know it today.

Don Simonelli, the New York designer, told a gathering of buyers in Toronto earlier this year that "minimal dressing will be the future of modern dress." This will consist of "layered looks" worn over a body stocking. The very word "fashion," he said, will not survive. Mr. Simonelli predicts the new look will result from a whole new technology that involves laser cutting, sonar sewing machines and seam welding. Instead of cutters and seamstresses, he sees a new world of fashion revolving around clothing engineers.

Already an ultrasonic sewing machine, developed by Branson Sonic Power, is available in the U.S. Using high-frequency sound, the machine literally welds synthetic fibres. It sews at a rate of 50 feet a minute and makes buttonholes in less than a second. Manufacturers are using it to sew blankets, parachutes and some types of clothing.

Yet the clothing industry has been mechanized only over the last 100 years. It's doubtful whether any of the political figures who took part in Confederation in 1867 wore anything but hand-tailored suits. Until 1850, clothing had always been sewn by hand and the first clothing manufacturing business in Canada — it produced men's wear — was started in 1868. At that time, there were only a few sewing machines in use. But their introduction was to revolutionize fashion.

The idea of a sewing machine had captured the imagination of a number of inventors

in Europe and North America. The most successful machine was the brainchild of a Bostonian, Elias Howe. Howe worked as a mechanic for a prominent New England machinist, a Mr. Davis. One day, as Howe passed the door of Davis's office, he heard him remark to two technicians: "Why do you tire yourselves out with this knitting machine for fishing nets? I'm going to tell you what you have to invent to make real money — a sewing machine."

Howe did invent a machine and he made money. But it was not a straightforward success story. When Howe perfected his working model, no one in the United States wanted it. Howe took out a U.S. patent and let his brother take the model to England. Penniless, the brother sold the model to a British manufacturer, William Thomas, for \$200.

Howe followed his brother to England to help Thomas to develop the machine. Howe considered Thomas a pirate and slave driver and returned to New York, his only possession being his U.S. patent.

"Sewing Machine — The Great New Invention" was the banner headline to greet him on arrival. A group of mechanics and a smart businessman had got hold of his blueprints, made some design changes and were mass-producing the machine.

Howe, determined not to be overlooked, sued the group and won — everyone making the machine had to pay him a licence fee. At one point, he was receiving more than \$4,000 a day in fees.

The impact of the sewing machine changed the garment industry almost overnight. Although first mass-produced garments were said to have been shoddy, the new machines — the sewing machine and the Band knife machine invented in 1860 to cut through several layers of cloth — still remain the basic tools of the industry.

As the 19th century drew to a close, men started looking at electric power to operate sewing machines. In 1883, Electrical World even advertised battery-operated sewing machines for \$35 to \$40. And Sam Charney, director of the Toronto Cloak Manufacturers' Association, recalls that in 1900 when his father was working for Eaton's, the company produced tailored clothing in Toronto using several sewing machines linked to a central electric motor.

One of the first domestic electric sewing machines, the Singer 101, appeared on the market in 1915. Although it was a good machine, women did not appear to be ready for this new household tool and it wasn't until 1935 and the appearance of the Singer 201 that electric machines really caught on. In Canada, the growth of the garment industry has reflected the increase

in population. For instance, in 1926 when the population was a little over nine million, there were only 359 factories producing women's clothing and 170 producing men's apparel for an estimated value of \$82 million. Today, Ontario produces women's and children's clothing worth well over the \$200 million mark and Quebec over \$700 million.

The industry is 95 per cent Canadian-owned. Quebec is the centre of the industry and this is reflected in the French-Canadian's flair for fashion. "The Quebec woman is traditionally more receptive than her counterpart in other provinces to new styles in dress," says Style magazine, Canada's leading women's wear trade publication.

Sixty per cent of the industry is located in Quebec, with Montreal the undisputed hub. Robert G. Webb, editor of Men's Wear of Canada, says that 75 per cent of men's apparel is manufactured in Quebec and about 25 per cent in Toronto.

"Canada's styling in men's wear has reached the point where very little clothing is imported. Canadian men like to buy Canadian-tailored clothing," says Mr. Webb.

Winnipeg is the third largest manufacturing centre, with an exceedingly large export market. It is noted for coat and suit manufacturing. Other industries are spotted across Canada from the Maritimes to British Columbia.

Quebec, as well as being noted for its high fashion and couturier design, also produces the largest quantity of low-budget garments. Toronto is noted for its fine bridal gowns, loungewear, swim suits and children's wear.

The centre of Ontario's industry is located in a one-mile radius from the corner of Adelaide Street and Spadina Avenue in Toronto. Here you may find speciality manufacturers producing distinctive styles that may be worn tomorrow at a cocktail party in Westminster, B.C., or on holiday in Bermuda.

One of the Toronto firms that reflects the industry is Highland Queen, located at 196 Spadina Avenue. The company is run by the Weiser family — David, the father, and sons Howard, designer, and Joseph, vice-president and sales manager. Highland Queen can be credited with putting Canadian tartans on the map, for in 1963 David Weiser was invited by the federal government to design a maple leaf tartan to be used to promote a Canadian image abroad and be ready by Centennial year.

The maple leaf tartan has now been adopted as the official tartan of the Canadian Armed Forces to be worn by all kilted

regiments and pipe bands.

Highland Queen's executive offices and manufacturing facilities are located on three floors on Spadina Avenue. In the cutting room, layers of material are marked out from heavy paper master patterns a cut in quantity using an electric cutting machine. Once cut, individual pieces are bundled together and sent to operators sewing.

"The idea that our industry is a sweat shop operation is a thing of the distant past," says Irving Cordes, executive director of the Toronto Dress and Sportswear Manufacturers' Guild. It earned its bad name, he says, in the early days before the advent of the sewing machine when tailors, skilled in cutting and sewing, employed apprentices at next to nothing to sew garments for their clientele.

The Toronto Women's Dress and Sportswear Manufacturers' Guild is one of the oldest manufacturing associations. It negotiates union contracts and represents management and their everyday problems. Sixty per cent of the industry now has union shops. Most workers employed in the industry are of Jewish, Italian, Portuguese and Greek extraction. As of August 1971, sewing machine operators receive a minimum salary of \$2 an hour, pressers \$2.98 and cutters a minimum of \$3.60. Eighty per cent of the employees are female.

Many of the ethnic people who immigrated to Canada are finding an outlet for their handicrafts in the growing number of boutiques. Says Mrs. Pat Robinson, a manufacturers' agent: "We are experiencing a rebellion against the production-line syndrome."

This is most evident in the array of garments on sale in boutiques across Canada. The boutique caters to customers from 15 to 40 and provides the unusual and the original for prices ranging from a modest \$10 to over \$300. The boutique garment may be completely hand-produced or, in the case of pant-suits or hot pants, have elaborate rich crocheted trimmings.

The boutique is seeing a revival of old handicrafts like macramé — an Arabic word meaning trimming — which had nearly vanished as a craft at the turn of the century. Today, belts, purses, pant-suits and hot pants incorporate this craft, which consists of knotting, plaiting and tying silk or cotton threads.

While the boutiques are enjoying a boom, the future of the industry as a whole appears far from settled. As those ill-fated manufacturers who based their production on the "midi" know only too well, nothing in the world of fashion can be taken for granted. □



The introduction of electricity rapidly transformed the clothing industry, which today employs a variety of sewing and cutting machines. These photos were taken in the cutting room of the Highland Queen plant in Toronto



Guiding OMEA District 1 in the coming year will be, seated, F. R. Cross, Nepean, first vice-president; A. J. Bowker, Gloucester, president. Standing: W. O. Murphy, Smiths Falls; L. H. Bracken, Brockville; D. A. Currie, Port Hope; W. M. Morrison, Bowmanville, and past president W. A. Taylor, Peterborough.



Pay-as-you-go policy endorsed

A resolution calling on Ontario Hydro to adopt a pay-as-you-go policy toward its capital construction program got unanimous approval from District 1 OMEA delegates at Kingston last month.

The resolution, submitted by Dr. R. H. Hay, of Kingston, was one of 13 discussed and approved for presentation to the OMEA-AMEU annual convention in Toronto next spring.

"We have got to pay attention to people who say that Hydro can't be allowed to hog the money market," said Dr. Hay, who is also chairman of the OMEA's power costing committee. He said there is a growing feeling by politicians that Hydro should be a department of government, and unless action is taken to curb its massive borrowing requirements the utility will cease to exist as it is today.

The resolution asks that Hydro "devise a scheme whereby a steadily increasing proportion of the annual capital requirements be met by a direct charge in the annual cost of power, so that in a period of not less than 10 nor more than 15 years the whole of the annual capital requirements

are met by such charge as a component of the annual cost of power and the debt of the system is stabilized and its growth halted."

Dr. Hay said Hydro's net debt is more than \$3 billion with current borrowings estimated at \$450 million.

If a plan could be developed by which a charge for capital construction requirements was levied now, the cost of borrowing would gradually be reduced.

He suggested that under such a formula, wholesale or bulk power rates would probably increase by 25 per cent in 11 years. But after 16 years, benefits would begin to accrue in the form of positive savings.

Dr. Hay also introduced a resolution calling on Hydro to include in the cost of power, by means of a special identifiable item in the interim and 13th bills, a charge to support the creation of funds to cover the cost of various research projects into new methods of electrical generation and anti-pollution techniques.

"At present, we in the utilities have no way of knowing what is spent," he said, sug-

gesting that if such a policy were established, the utilities would be in a better position to make recommendations.

Peterborough Utilities Commission submitted several proposals. One would give utilities the power to compel customer change the location of service entrance and wiring installations to permit conversion to underground wiring in subdivisions when in the public interest.

The resolution was prompted by difficulty experienced in a commercial area of Peterborough where such a conversion was requested by a merchants' group, but two customers refused to relocate service entrances and delayed completion of the project for several years.

Peterborough also sought and received support of the meeting on a proposal that would require all subdivision development within three miles of a municipal utility follow the utility's line construction and pole location standards.

Such a step would be desirable in the event of possible annexation by the municipality, the resolution said.

OMEA president Andrew Frame presents cuff links to W. H. Walker, of Port Hope, for 25 years' continuous service.



so advocated were greater safety precautions when metal siding is installed on buildings. It was suggested that building inspection procedures be changed to ensure that electrical inspectors are advised when permits are issued for metal siding.

The suggestion was prompted by an incident in Peterborough in which metal siding was placed on an older home and a tree, pushing against electric wires, caused the building to become a conductor of electricity.

The Peterborough utility also submitted a resolution asking that the OMEA resolutions committee refrain from recommending for or against individual resolutions submitted at the annual meeting in Toronto. It was felt that many good ideas were either tabled or defeated on the basis of comments by the resolutions committee.

A resolution from Oshawa asking that the existing method of handling the return on equity and cost of return be studied with a view to removing inequities that exist under the present system.

The resolution argued that some municipalities are unable to serve large industries within their jurisdiction because it is economically impractical. Consequently,

Ontario Hydro is called on to serve these industries as direct customers.

Another Oshawa resolution asked for a review of the present method of billing large industries to determine how rate disparities may be eliminated.

Regional government came in for some debate in two resolutions from Nepean. The utility asked that in any legislation establishing regional hydro commissions, all debts incurred by any member commission be charged against the rates paid by customers residing in that area. The Nepean resolution added that under regional government, some municipalities have incurred unusual and extraordinary debts in anticipation of the formation of regional governments.

In its second proposal, Nepean asked for a change in legislation to require that regional governments refund to the electric utilities, on a yearly basis, any surplus of interest earned over and above the guaranteed interest on the respective utility sinking fund debentures investment.

The resolution stated that with regional government legislation, public utilities must go through both the local and regional

governments to borrow. The regional governments have adopted the policy of issuing sinking fund type of debentures with fixed rates and then retain any surplus interest realized from the investment of the principal paid annually by the utility over the interest guaranteed by the regional government.

The Nepean resolution claimed that such action denied utilities the yearly use of surplus interest.

Gloucester Township Hydro submitted a resolution urging the AMEU to study means of teaching French to employees so they can better serve French-speaking customers.

Kingston delegates see Lennox

Overcast skies, a stiff Lake Ontario breeze and the threat of rain didn't dampen the spirits of District 1 OMEA delegates as they toured the site of Hydro's new Lennox power station last month.

A chartered bus from Kingston transported delegates to the site where they received a briefing on the project and then donned hard hats for the tour.

Deep River Hydro was well represented at the District 1 meeting. Looking over the program are Mayor Peter McConnachie with commissioners R. J. Klock and A. J. Vale.



Among the recipients of long-service awards at the District 6 meeting was Fergus commissioner L. D. Darroch. Presenting him with a 15-year certificate is OMEA president Andrew Frame.



They were shown the 900-foot-long excavation which, in a few years' time, will be the forebay of Ontario Hydro's first oil-fired generating station. Almost 1,000,000 cubic yards of limestone have been removed and pouring of the concrete foundations is about to begin. Later, delegates returned to Kingston for two days of meetings.

Eight long-service awards were announced at the conference. W. H. Walker, of Port Hope, was given a set of cuff links in recognition of 25 years' service; 15-year certificates went to R. J. Fleming, Oshawa, Dr. C. E. Lafrance, Hawkesbury, T. A. Worth, Bath, W. A. Mason, Carleton Place, R. H. Robbins, Braeside, J. N. Brown, Bancroft, and A. H. Jeffrey, Millbrook. □

Get involved, utility staff told

Utility personnel should be encouraged to become active in their community, says W. R. Powell, general manager of Peterborough Utilities Commission.

Mr. Powell was addressing delegates on marketing which, he said, depends mainly on people.

"All the high-sounding methods developed in the books regarding advertising, promotions, brand names, etc. cannot be done in the smaller municipalities. It must be just plain people-to-people dealings."

Mr. Powell said that a successful small utility will probably have an outgoing staff that gets involved in service club and community activities. By their actions, they build up a picture of the organization they represent and, by their advice, influence the public into thinking about their product when some new project occurs.

Mr. Powell added that marketing includes the product, the price, availability, service, advertising promotion and selling.

While Ontario utilities are able to distribute a superior product at a low price to the customers, other factors such as service must be considered, he said.

"Is the customer getting a friendly reception and being handled efficiently? Does he know what specific services your utility offers, or does he read only out-of-town advertising and finds it does not apply to his town?" □

district six

Task Force role to improve Hydro

Task Force Hydro is not a Royal Commission investigation into the operation of Ontario Hydro, but is a group of interested citizens working for something in which they believe, says its executive director Richard M. Dillon.

Speaking to delegates attending the annual meeting of District 6 of the Ontario Municipal Electric Association at Elora, Mr. Dillon said the purpose of Task Force Hydro is to determine how Ontario Hydro can be improved and suggest changes.

Making his first visit to an OMEA gathering, Mr. Dillon observed that the association is "a special kind of organization — a sort of brotherhood that can only happen among a bunch of people working together for the common good for some in which they really believe."

District 6 executive includes (standing):
 Filsinger, Goderich; W. S. Smith, Fergus;
 C. Smith, Guelph; A. T. Brown, Galt; C. Lipp-
 igt, Harriston; and J. McMichael, Listowel.
 seated: G. Shepherd, Elora; John Lind, St.
 ys, first vice-president; D. R. Larkworthy,
 ntford, president, and Archie McGugan,
 merston, past president.



Tribute was paid to Clinton commissioner A. (Red)
 Garon at the District 6 meeting. Retiring district
 president Archie McGugan looks on as OMEA
 president Andrew Frame presents a 15-year long-
 service certificate to Mr. Garon.



said all members of the task force have
 ard a great deal about the OMEA, but
 or me it really came alive today."

r. Dillon said the task force steering com-
 ittee is a group of six people working
 ward making recommendations to make
 ntario Hydro more effective and more
 sponsive for the future. "But there's not
 ry much wrong with Ontario Hydro from
 at we've seen so far," Mr. Dillon added.

e said the challenge which faces the
 nicipal electric utilities today is to sup-
 ort the changes that will bring about the
 ight-for improvement in Hydro's
 eration.

r. Dillon was accompanied by Ontario
 ydro Chairman George Gathercole, who
 ld the gathering that the growth of elec-
 C power output in Ontario has been of
 eat benefit to the province.

e said Hydro has no mandate to expand
 system willy-nilly and no mandate to
 ild more generation facilities. "But we
 have a mandate to supply electric
 ergy. Our duty is to meet the needs for
 lectric power for the industry and the
 ople of this province," Mr. Gathercole
 rd.

He suggested that Ontario Hydro is not
 perfect and that a great deal of good could
 come from Task Force Hydro. □

Compec boosts sales in two counties

Compec, the Co-operative Marketing Plan
 for Electric Commissions, had made its
 debut and is working well in the OMEA's
 District 6 region, says John M. Lind, chair-
 man of the association's load building
 committee.

Mr. Lind told delegates to the District 6
 meeting that two Compec groups have
 been formed within the area and, since
 their formation, sales have "mushroomed."

He said one of the groups was formed in
 Perth County and the other in Huron
 County. Sales assistance is provided
 through Ontario Hydro's area offices in the
 two counties.

One of the advantages of a sales co-
 operative, Mr. Lind said, is the ability to
 make bulk purchases for all utilities. He
 said smaller utilities, in particular, reap the
 benefit through this type of operation.

Outgoing president Archie McGugan, of
 Palmerston, called on all delegates to "do a

public relations job" for both their own
 utility and for the OMEA. He said that "we
 must get the people in our area to know
 the good job the local electric commissions
 are doing, and Compec is one way in
 which to do it."

Mr. McGugan added that through the
 OMEA and AMEU, local commissioners
 must be prepared to answer their critics.

"I personally believe in the Hydro family,
 and urge all commissioners to do the same.
 We provide the safest, cleanest form of
 energy available today, and we combine
 this with excellent service.

"It's the old story — we must tell the
 people," Mr. McGugan said.

along hydro lines

Kosygin visits Pickering



A peek at CANDU

Soviet Premier Alexei Kosygin included an hour-long tour of the 2,160,000-kilowatt Pickering nuclear power station on his nine-day visit to Canada last month.

Mr. Kosygin, who was greeted by Ontario Hydro Chairman George Gathercole, saw Pickering's first 540,000-kilowatt unit running at full power. He also visited the control room, the face of the third and as yet uncompleted reactor and peered into the spent fuel bay. He was accompanied on the tour by senior officials of Ontario Hydro and Atomic Energy of Canada Limited, the reeve of Pickering and the presidents of the OMEA and AMEU.

On the tour, he asked a number of questions about Canada's nuclear power program and spoke to several men at the plant, including a first-operator in the control room. Mr. Kosygin is shown flanked by Mr. Gathercole, left, and Canada's Minister of Defence, Donald Macdonald. □

Black box

The first natural gas fuel cell power plant has been placed in operation in a U.S. home.

The start-up ceremony, held in a condominium home in Farmington, Conn., marks the start of a nation-wide test program

to develop a new energy service. The program will initially be extended into the Chicago and suburban area.

The units are about the size of a residential gas air-conditioning unit and are reported to have more than enough power for the average household. Tests are planned in homes, apartments and commercial establishments.

Plant to burn lignite?

Construction of a privately-owned 600,000-kilowatt thermal generating station near Moosonee is under consideration, Pickering's William Davis revealed recently in Timmins.

The plant would be designed to burn local lignite and power would be sold to Ontario Hydro and distributed over the provincial grid, he said.

The Alberta Coal Company, which holds the rights to the lignite deposits, is discussing the idea with Ontario Hydro and studies are being conducted to determine transmission and production costs.

Back on the Madawaska?

Although the emphasis is on thermal generation to meet Ontario's growing electrical requirements, Hydro continues to investigate new sources of hydro-electric energy.

Now comes the announcement that an 87,000-kilowatt plant may be built on the Madawaska River near Arnprior at a cost of \$51 million. The final go-ahead depends on provincial government approval, community acceptance, soil tests and the effect of the new station on upstream plants.

At present, Hydro operates four plants with a total capacity of 448,900 kilowatts on the Madawaska River.

Hydro 'doctors'

Under a new program launched by the Ontario Electrical League, electric heating customers will get the diagnostic service of electrical specialists.

Ontario Hydro has appointed sales service specialists in each of its seven regions to co-ordinate the program at the local level. The prime objective is to maintain goodwill by keeping customers' heating systems working satisfactorily.

The plan is that Hydro servicemen would diagnose the problem and then refer the customer to a heating contractor.

Mini-reactor comes on-line

A compact, low-power nuclear reactor to be used for environmental research is now in operation at the University of Toronto.

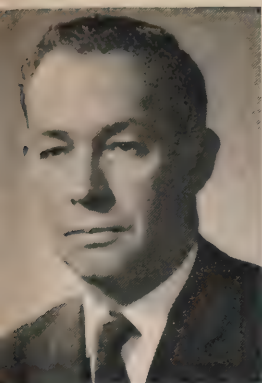
Called Slowpoke (Safe Low Power Critical Experiment), the five-kilowatt reactor was built by Atomic Energy of Canada Limited. Testing began last June and a September 30 ceremony marked AECL's turnover of the reactor to the university.

The reactor will be used to bombard materials with neutrons for analytical purposes. For example, it can be used to determine the amount of mercury in fish, to study water and air pollution, to date material found in archeological excavations and to study particles of spent gunpowder found on suspected criminals.

The university is already testing soil samples from Holland Marsh, 40 miles north of Toronto, for traces of pesticides.

Slowpoke differs from other types in its simplicity, safety and ease of operation. It can be turned on with a single switch and left unattended for up to four hours at a time. If water surrounding the core increases in temperature by only a few degrees above normal, the reactor shuts itself down.

Director dies



Warren Clifton

Warren Clifton, head of Ontario Hydro's accident prevention division since 1965, has died at the age of 46.

Mr. Clifton was born in Cooksville and educated at Port Credit. He graduated from the University of Toronto with a Bachelor of Applied Science degree in 1946 and joined Hydro in May, 1947.

He held various positions in the research and operations divisions and in 1953 became safety and fire engineer in accident prevention. He held that position until his

appointment in 1965 to the position of director.

He was a member of the Association of Professional Engineers of Ontario, the National Safety Council and was a past president of the Canadian Industrial Safety Association.

Dr. D. K. Grant, director of medical services, has taken over responsibility for accident prevention as part of his duties.

Teaching aid

Any questions about the electrical industry are answered in a detailed study aid prepared by Ontario Hydro for senior elementary and secondary school teachers.

The package consists of a series of scripts and slides which deal with all aspects of electric energy from generation to local distribution. The information is designed to fit the curriculum needs of teachers in grades 7 to 13 and will be available on a loan basis from January 1.

Looking to 1973

The year 1973 may still be a long way off, but plans are well underway for the largest electrical trade show to be held in Canada.

The Ontario Electrical League has booked the Automotive Building at the CNE in Toronto for March 27, 28 and 29, 1973, for a show expected to attract a large gathering of people from contractors to utility staff.

In addition to seeing the latest electrical equipment and apparatus on display, visitors will be looking for new ideas and applications, and seeking information on installation, maintenance and operating costs. Entitled Electric Showcase '73, the show will be presented in five centres across Canada. It will be moved lock, stock and barrel by unit train.

Nuclear pact with Japan

Canada and Japan have signed a five-year agreement to exchange technology on the use of heavy water in nuclear reactors.

The agreement stems from a common interest in power reactors moderated with heavy water and cooled with boiling light water.

The Japanese are building a 165,000-kilowatt prototype reactor similar to the AECL-designed Gentilly nuclear power station which is being commissioned near Trois Rivières, Que.

The Japanese are also building some U.S.-type light water reactors which use enriched fuel. A swing to heavy water reactors for a major industrialized country like Japan would add prestige to the Canadian system.

Atomic Energy of Canada Limited says co-operation with Japan is expected to contribute greatly to the development of heavy water reactors in both countries.

New jobs for three

Three members of Ontario Hydro's public relations division have assumed new responsibilities.

W. J. Killough, district public relations officer, has been appointed senior public relations officer — corporate advertising and symbol. He will also work with Hydro's air and water environmental committees.

H. I. Lloyd, formerly Georgian Bay region public relations officer, becomes senior public relations officer — regions and generating projects, and will work with the joint OMEA-AMEU public relations committee on PR programs for municipal utilities.

D. W. Robinson, formerly PRO for the Lennox project, has been appointed senior public relations officer — property, lines and stations.

Power costs pegged

The wholesale cost of power to municipal utilities in 1972 will be pegged at the existing level for the time being.

In a letter to the chairmen of more than 350 municipal utilities, Ontario Hydro Chairman George Gathercole says the Commission has decided to defer an increase in wholesale rates because of uncertainties facing the Canadian economy.

Mr. Gathercole points out, however, that power costs are continuing to rise and must ultimately be met through rate increases. "The shortfall in revenue (in 1972) will be met in part by a special withdrawal from the rate stabilization reserve," he says.

Rates charged to 87 large industrial customers served directly by Ontario Hydro will also remain unchanged temporarily.

Wholesale power rates comprise the major part of a municipal utility's costs.

"The Commission recognizes the desirability in the present period of adjustment and unemployment of avoiding any action that would hamper or impede the special public measures that have been adopted to stimulate the economy," says Mr. Gathercole.

Ontario Hydro's costs are rising for fuel, equipment and supplies, anti-pollution measures and wages and salaries, he adds. "To maintain the financial viability of our enterprise, revenues must ultimately be adjusted to equate costs."

He says the deferment of rate adjustments must be considered short-term and the situation will be kept under review during 1972.

Two honors



Dr. Hambley

Ontario Hydro's former general manager, Dr. J. M. Hambley, received two honors recently.

He was honored by the Engineering Institute of Canada for noteworthy contributions to the science of engineering and was presented with the Sir John Kennedy Medal at the institute's annual meeting in Quebec City.

In addition, Dr. Hambley has been elected a director of Canada Wire and Cable Company. Dr. Hambley retired as Hydro's general manager in 1970 after a career that

spanned 40 years, the last 10 of which were as general manager.

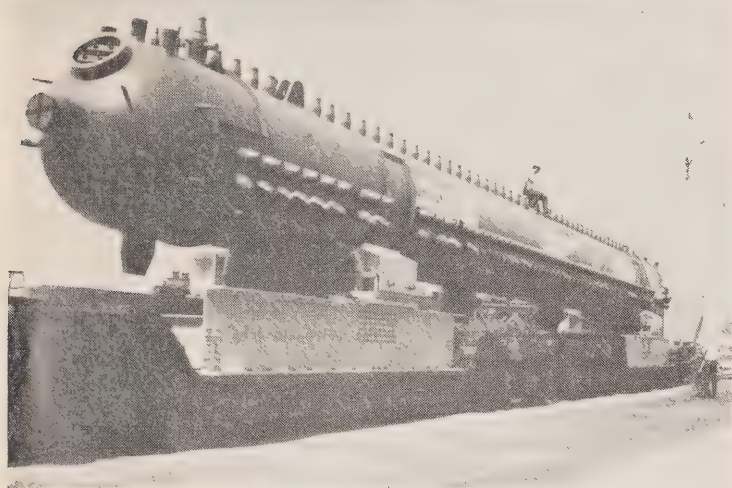
Manager for 31 years

Although Robert Coleman, manager of Port Hope Hydro for 31 years, retired recently, he'll remain a technical adviser to the utility.

At a reception in which he was feted by fellow employees, the town and the commission, as well as friends in the utility business throughout the province, Mr. Coleman was hailed as "one of the brighter lights of Hydro."

He worked for the Port Hope utility for 45 years and followed in his father's footsteps as manager in 1940. Mr. Coleman is a veteran member of Port Hope Rotary Club and serves on the town's planning board. □

Steam back on the rails



Too big for the mailbox

Having produced the largest Canadian-built boiler for Ontario Hydro's Nanticoke generating station on Lake Erie, Babcock Wilcox Canada, Ltd., of Galt, had to find ways of getting it to the site.

Part of the 187-foot-high unit was shipped in sections, but the steam drum, weighing 300 tons and 100 feet long, had to be transported intact. Engineers decided to send it on two railway cars and the journey was made without incident. The boiler, along with seven others like it, will produce 3,600,000 pounds of steam per hour when in use.

Nanticoke is slated to begin producing electricity later this year. When completed in 1977, the eight-unit, coal-fired station will have a capacity of 4,000,000 kilowatts. □

Rent a (coal) car

Because of an acute shortage of coal cars, Ontario Hydro is to rent 75 to form a 7,500-ton capacity unit train running from mines in West Virginia and Pennsylvania to the port storage area at Ashtabula, Ohio.

A first for Hydro, the cars will be built for a Chicago firm and leased for a 15-year period. Since Hydro's own cars will be used to transport the coal, a special rate will be given by the Penn Central Railroad.

More than 9,000,000 tons of coal were shipped last year through Ashtabula and its sister port of Conneaut. □

Floating stations

Two of the top industrial giants in the U.S., Westinghouse Electric Corporation and Tenneco Inc., have pooled resources to build a \$200 million "assembly line" at an undisclosed site to turn out four 1.2 million-kilowatt floating nuclear power plants a year.

The move is a joint effort by the two companies aimed at so regulatory delays in the nuclear power field. Says John Simpson, president of power systems for Westinghouse: "very necessary step for the future growth and utilization of nuclear energy program in the U.S."

The initial agreement calls for the completion of technical economic studies by the end of the year.

The power station "factory" would consist of a large site steel plates arriving on barges at one side for prefabrication then proceeding to eight slips where concrete is poured to duce a 400 ft. square floating platform. Each platform would a displacement of 150,000 tons, roughly that of the new oil going tankers.

Westinghouse engineers envision a completely finished, tested, floating power station with only the nuclear fuel load and plant operating being left to the purchasing utility. Br waters and submarine cables would have to be installed.

It's expected the plants would be anchored on the shallow continental shelf off the U.S. coastline.

Recycling centre

Scarborough PUC is doing its bit to help cut down on "pollution."

The utility has set up bins for the collection of glass and tin at its main depot for dispatch to the borough's recycling centre a project undertaken by the local works department.

Five bins are being used for clear glass, colored glass, pul cans and other tins. The fifth bin is for the empty cartons in which the debris is taken to the centre.

municipal briefs

Goderich PUC owes much of its success in the electric heat field to Wilson McCreath. Several years ago, Mr. McCreath trained in electric heat promotion, which now accounts for a considerable portion of his time. Manager D. A. Rolston says of 16 new electrical services installed in the third quarter of the year, 13 were for all-electric homes.

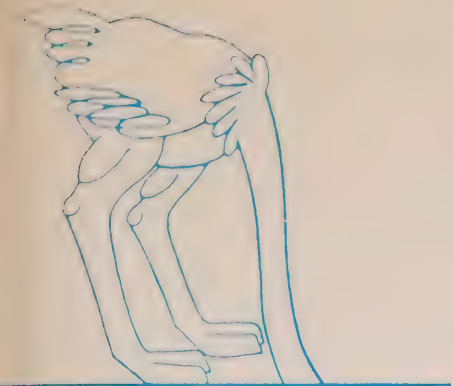
Ontario Hydro's Western Region has a new consumer service superintendent, R. G. Yates. He replaces J. F. Wicks, now appointed lines engineer in the region. Mr. Yates was formerly distribution engineer.

Compec-Norfolk staged a highly successful fashion show at last year's Norfolk County Fair in Simcoe. Seven Hydro models appeared in the show, which played to capacity audiences won an honorable mention from the judges. Commentary during the show included reference to the Compec organization and its benefits. Some new appliances were also displayed.

Alliston PUC has a new manager. Glen Chrissley, who is secretary-treasurer for the utility, took over the duties of manager after the resignation of Bill Robbins. Mr. Robbins has been appointed manager at Orangeville Hydro.

Hamilton Hydro participated in the community's annual safety week parade with a line truck decorated with safety posters. Safety week also features displays in stores and banks, driving programs, lectures and industrial safety campaigns.

London PUC has auctioned off 400 items at prices up to \$400. Its former office at Dundas and Wellington streets. More than 200 persons came to bid on desks, chairs, draperies, mirrors and miscellaneous office equipment. The PUC moved in August to the new city hall.



as don wright sees it

Among the few commodities with which we have been plentifully endowed is hot air and some of the stuff we let off through these columns last month landed in hot water.

On that occasion we happened to observe that while Neanderthal man was pretty well extinct, his likeness could still be found in contemporary society – particularly among members of the engineering profession. Iron rings rang out in wrath and slide rules were brandished in fury.

"Comparing engineers to Neanderthal man puts me in such a snit," wrote one. "May the bird of paradise fly over your desk and wet in your out-basket, thereby completing the circuit I've wired to your hair."

Another took unaccustomed pen in hand and ended his blast as follows: "Receding foreheads, undeveloped jaws and dolichocephalic skulls are very probably no more prevalent among engineers than they are among the more intelligent sectors of the population."

And so we retract the remark for the lack of supporting evidence. Still, we did receive a half dozen mysterious letters written on stone tablets and left, we have reason to believe, by some very hairy club-carrying gentlemen dressed in leopard skins. They, too, took strong exception to the comparison.

■ We also had a letter from a charming lady in England who allowed as how she enjoyed the inanities of the column very much except that we seemed to pick on her home and native land too often as the butt of our humor. "Obviously," she opines, "you are not English."

Now that's a pretty serious charge and one she could lay successfully against hundreds of millions of otherwise nice people – but not against us.

The fact is, we come from a long line of aggot gatherers who plied their trade beneath the great oaks of Sherwood Forest back in the days when it was full of friars

and hoods and odds and bodkins. The sheriff of Nottingham was head of the fuzz in those days and Marian was still a maid so that we feel our ancestry is such as to permit us to continue to jab away with some impunity.

In deference to our correspondent, though, who accuses us of regarding her countrymen as "nobbut tenpence to t'shilling," we will attempt to resist any further tweaking of the lion's tail and confine our remarks to those aspects of the English scene likely to reflect to its dignity and greater glory.

■ Unfortunately, our platter of English items is inordinately bare – except for two or three unrelated tidbits which may not be entirely in keeping with the new policy. Like the one in the Norwich Daily Press. Succinct and to the point, it reads: "A rooster named Weasel crowed 32 times in 15 minutes to win a contest at the annual Aylmer Fair."

No doubt, Weasel had plenty to crow about and we wish him well. Good work, old cock.

■ And much is being made in the British press of late about the discovery of a football player with a university education. This remarkable fellow apparently plays for Liverpool and he's thought to be the only professional footballer in all the country who has been to university and come away with a degree.

This is indeed remarkable in a land where soccer players outnumber crumpets two to one and it may be that belting a ball about with the old bean from boyhood tends to unsettle the old marbles.

It's odd, too, considering the significant correlation which has been proved to exist between intelligence and football-playing. This has been pointed out by a psychoanalyst at Harvard University who is trying to determine what makes industrial executives tick. Among his conclusions – the prototype of the successful organization man of the 1970's is the professional football player.

According to the good doctor, these bruisers have "game character" – a combination of team spirit, controlled aggressiveness, efficiency, detachment, flexibility, willingness to play by the rules and a desire to play with the best people.

"These are the same qualities that make for effective engineers and managers in highly-technological organizations," he says.

And we are not about to argue.

■ Education for everyone has long been the great American dream, but in some places it's becoming a nightmare. In Virginia, for example, grade A eggheads are a dime a dozen. They're up to their

knees in Ph.D.s and calling for plumbers to shut off the tap.

Speaking in Roanoke recently, the vice-president of a state power company said: "There are hundreds of scientists and engineers walking the streets of Virginia today, looking for jobs, while you and I have a hard time finding a good plumber or electrician."

He points out that a good plumber with four years of training can make as much as a graduate engineer after four years of college and suggests that the "sheepskin syndrome" is contributing to the shortage of technical skills.

And he has a point. Ph.D.s are nice to have around. They can lecture and do research and design nuclear reactors and write theses. But all the doctors of bugology in the world won't help when the toilet has a seizure or the hot water tank succumbs to a perforated ulcer.

■ Still another critical letter arising out of last month's disastrous potpourri chides us for lack of depth in the remarks we made on the nesting habits of crocodiles.

"Absorbing as far as it went," our correspondent observes, "but the subject of crocodilia deserves much fuller treatment."

She appears to be convinced that the magazine should be devoted pretty well exclusively to the life and habits of these roguish reptiles and leaves us with a nugget or two of information we'll file away for future reference.

Everybody knows that crocodiles are amphibious reptiles and most of us know that they are the closest living relatives of the dinosaurs, but are you aware that the common ordinary variety of crocodile you're likely to meet in the funny papers or down at the local bog is a far cry from his great, great granddaddy? According to our correspondent, young Nile crocs could gallop – "bounding along like a squirrel."

All in all, we're glad we came along as late as we did. Leaping lizards we can do without.

■ And two scientists from Guelph, right here in Ontario, have been in the news lately for filling an important void which has long existed in the field of zoological investigation. These fellows have been investigating the gait of the kangaroo and have managed to isolate four distinctive methods of locomotion ranging from a "quadrupedal bound" to a "bipedal hop."

Some will, in their ignorance, remain unimpressed with the significance of this work, but these are the kind of people who will scoff at the galloping crocodiles.

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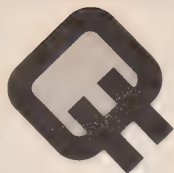
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the cover

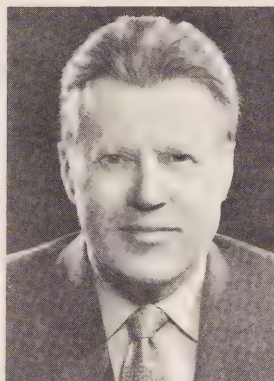
In linework, as in most other jobs, horses long since became the victims of technology. But this month we take a nostalgic look at the late twenties and the construction of the Gatineau transmission line, a remarkable engineering feat considering it was built by muscles and horsepower. Many of the men who pushed this 200-mile link through rock and swamp got together recently to relive old times (see page 12).

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On the Commission's behalf, may I wish all the readers of Ontario Hydro News a Merry Christmas and a Happy and Prosperous New Year.

George Gathercole

Chairman, Ontario Hydro.

George David Young(George)Leacock

Thomas James(Jim)Leacock

Arthur Murdock(Dick)Leacock

Charles John Gladstone(Charlie)Leacock

Edward Peter(Teddy)Leacock

Stephen Butler Leacock

odd man out

by Elizabeth Kimball

Author's five brothers were all electrical pioneers

Ontario's hydro system "lights the houses so cheaply and so brightly that you can play poker for the bare cost of the whisky," observed Stephen Leacock in one of his most popular works of humor, "Frenzied Fiction."

The remark was based on, literally, close research. For the author's five brothers (and his brother-in-law, my father) were all, or had been, "in electricity." In fact, the humorist was odd man out among the electrical Leacocks . . . the only male in the family who had not been in on the exciting adventure of electrifying some part of North America.

As a niece of these five pioneers, and of Stephen Butler Leacock, I had a ringside seat during many family meetings which seemed to buzz with electrical terms. Words such as "ohms," "amperes," and "kilowatts" rang in my infant ears. And, as if this verbal daring were not enough, there was the heady reflection that my uncles actually put these exotic commodities into the skinny black wires that threaded together the towering wooden poles along Ontario's roads.

I recall, for example, Uncle George describing how he and my father tested wiring they installed in the old farmhouses. "We would wet our fingers and pinch the wire," he explained. "If it bit us, we could go on to the next job ; if not, we had to take another run at it."

Uncle George, who was to be president of Moloney Electric Company of Canada, Limited, for over 30 years, had a more practical education in electricity than his brothers ; both he and my father climbed poles and personally wired houses. In fact, Uncle George broke both his legs falling from a pole, and walked with a cane for the rest of his life.

The two oldest of the Leacock "boys," Jim (Thomas James, born in 1867) and Dick (Arthur Murdock, 1868) arrived at their eventual careers deviously. After leaving Upper Canada College, where most of the brothers boarded during their teens, Jim went to Western Canada as private

secretary to his uncle E. P. Leacock, and Dick joined the Northwest Mounted Police.

Stephen Leacock seems to have held a dim opinion of the mental capacities of his two older brothers. In "The Boy I Left Behind Me," he wrote of the classroom their private tutor, Mr. Parks, set up in my grandparents' farmhouse: "I had to be Class 1, but my brothers didn't care, as they freely admitted that I was the 'cleverest' . . . they looked on it as no great asset!"

Whatever their academic shortcomings, Uncle Dick invented (or so I was told by my mother) and manufactured a field coil, and Jim acted as his sales manager.

And when the A. M. Leacock Company was sold after their deaths, its net assets were \$31,000. As this was in 1932, this does not seem too bad a showing.

The third of the electrical Leacocks was Charlie (Charles John Gladstone Leacock), two years younger than Stephen. After Upper Canada College he had read for law at the University of Toronto, but as my grandmother's fortunes were rapidly dwindling then, and she could no longer afford to keep both Stephen and Charlie at university, the latter did not complete his course.

After working for a short time for the CPR, he began his electrical career as an erecting engineer with Westinghouse Electrical and Manufacturing Company and subsequently worked on the electrification of the New York and London subway systems. A brilliant scholar, his early promise was cut short when (before he was 30, I believe) he suffered the first attack of a mental illness which was to periodically interrupt his work for the rest of his life.

For the greater part of his adult life, Uncle Charlie operated as an independent broker of used electrical equipment, roving over Ontario buying up old generators and other parts and selling them.

Once, dining with him at the Engineers' Club in Toronto, I recall being torn between admiration and embarrassment when he predicted, to an obviously skeptical young club member, that "one day New York city will be lighted by power from the Arctic." I was aware that Uncle Charlie was sometimes irrational, and at that time, about 1938, the theory did sound pretty far out, although hydro-electric developments in the Canadian north and the interconnecting of power systems have since testified to his foresight.

Charlie Leacock has been credited frequently with being the first man to recommend 60-cycle power to Ontario Hydro.

Stephen Leacock at work. Many of his stories originated from his brother, George.

I cannot verify whether he deserves the credit, but I do know that he split with Adam Beck over the issue, warning him "You will make Ontario a 25-cycle island in a 60-cycle country." These prophetic words may well have cost Sir Adam some uneasy stirrings in his grave when, in 1962, the province embarked on a \$352 million program to achieve the then imperative conversion.

Next in line of the electrical Leacocks was Teddy (Edward Peter, born in 1875). He was in and out of this career fast. "The Hamilton Spectator," interviewing Uncle George, reports that "He (George) started early in the electrical business, inveigled his brother, Ted, a pharmacist in Hamilton, into a partnership. After a couple of years Ted went back to his old line in Calgary."

As a professional engineer and long-time president of Moloney Electric, the career of George David Young Leacock (born 1896) has been thoroughly documented. His bare-bones biography presents a picture not only of a young man in a hurry but of the wide-open field electricity offered in the ambitious when this century was young: "1896, General Electric, international wiring; 1899, Togoma Water and Light Company, Sault Ste. Marie; 1900, Electrical Chemical Company, Idaho; 1903, formed Northern Electric Supply Company, Northern Ontario; 1906, John Forman Company, sales staff; 1911, Packard Electric, sales staff; 1913, Moloney Electric, Toronto sales manager; 1922, president of Moloney Electric." He retired that post around 1956.

The partnership into which he inveigled Uncle Teddy was their small shop in Orillia, the Northern Electric Supply Company. My cousin, Douglas Sheppard Barrie, recalls visiting it as a very small child, and being set to frosting lamp globes. Granted that this was likely intended as entertainment rather than slave labor, the incident gives one an idea of how unsophisticated the industry must have been in those days.

The same cousin recalls hearing about a game which was a favorite among uncles and aunts and their friends at the turn of the century. It was, according to my cousin, "rather shocking, and, if not mistaken, frowned on by the clergy." It consisted of having "the boys" (George and Teddy) bring home a small generator, which could be cranked by hand with handles on the terminals. Their



© Karsh, Ottawa

ests were placed in a circle boy-girl-boy.
c. The unfortunate who was officiating
ad to turn the crank, and all the others
ELD HANDS as long as they could bear
e current."

lthough most of these entries in the
bove chronology have settled down into
story, the few men who knew and worked
ith George Leacock still remember him
"the funniest man alive."

ave long since become accustomed to
e remark "between ourselves, much
nnier than Stephen," and to the frequent
rollary, "actually, most of Stephen's
ries came from George in the first place."

ere was a great deal of truth in the latter
mark for the two brothers, who were
ry close, would regale each other with
atever had most recently tickled them.
e story would improve in the telling...

and very often end up in one of Uncle
Stephen's books.

Quoting, again, from "The Hamilton
Spectator":

"Once Stephen sent him (George) his
latest book with the note, 'Not a single one
of these stories is yours.' With the subtle
waggery of a master, George telegraphed
back, 'I've read your book; and I can
believe it.'"

Ted Chandler, of Moloney Electric, passed
on to me a favorite story of his uncle, Ralph
Chandler, for whom Uncle George worked
at one time. Shaking his head over George's
monumentally untidy desk, Ralph re-
marked, "I don't see how you ever find
anything." To which George quickly
retorted, "Why do you say that? There are
4,000 papers on this desk, and I've lost
only one."

George Dunfield, Moloney's present presi-
dent, recalls George telling him of his

early days with a base metal mine in
Montana. The day shift was handled by
young Leacock and a donkey "The donkey
died, so I got promoted," recounted
George. From Mr. Dunfield, too, comes a
classic example of the devotion of George
and a long-time boon companion to
"improving the (horse) breed."

Not daunted by finding themselves, on
race day, penniless, they arranged a loan at
the nearest bank. "It was a small loan
about \$100, and easily arranged," related
Mr. Dunfield. "As the papers were being
drawn up the bank manager inquired,
'How long should we make the term of the
loan, Mr. Leacock?' George looked out of
the window and made a quick calculation,
'Well, the day is sunny and clear. The track
should be fast. We should have your
money back in 1.32 minutes.'"

safety is the key to handling toxic hydrogen sulphide gas at the Bruce heavy water plant



*just like the
old family fridge*

by Steve Howe

Bob Icely talks about the hydrogen sulphide gas used in heavy water production as if it were ammonia in an old type of refrigerator. "Both are toxic, but they don't present a problem if they're handled properly and confined in a closed system."

And as plant manager, Mr. Icely is satisfied that the \$155 million Bruce heavy water plant nearing completion on the shore of Lake Huron will be the safest, biggest and most efficient heavy water producer in the world.

Heavy water, or deuterium oxide, is an important ingredient in the CANDU (Canadian Deuterium Uranium) reactor generating electricity by nuclear fission. It is employed as a moderator to slow down speeding neutrons emitted by the small amounts of unstable U-235 found in the natural uranium fuel used in CANDU reactors. It is also employed to transport heat from reactor to steam generator.

The slow neutrons are captured by other U-235 atoms which then split, giving off more neutrons and producing a chain reaction.

Heavy water isn't the only moderator in the world, and it's not cheap, but it allows CANDU to have inexpensive fuel. Most other reactor designs require uranium enrichment, a costly process requiring massive capital investment. As a moderator, heavy water is more than 30 times more efficient than ordinary water; light water has a moderating factor of 60, graphitic heavy water 2,000.

Deuterium is a naturally occurring substance, but always in combination with other elements and in trace quantities. Identified first in the early 1930's by Canadian chemist H. C. Urey, deuterium is in ordinary water in the form of HD. The ratio of one part deuterium to 7,000 parts hydrogen.

As an isotope of hydrogen (it is also called heavy hydrogen), deuterium gets its excellence as a moderator from the presence in its nucleus of a neutron, in addition to light hydrogen's one proton and an electron.

Extraction and concentration of heavy water at the Bruce plant will take place in multi-stage separation towers that exploit the tendency of deuterium atoms to concentrate in cool (35°C) water or hot (135°C) hydrogen sulphide gas. As the deuterium migrates to the liquid or gas, progressive enrichment from HDO to D₂O proceeds in stages. The result is a product of 30 per cent deuterium, which is then distilled in finishing towers to reactor grade D₂O (99.75 per cent pure).

In theory, this water-hydrogen sulphide dual temperature process is fine. But does it work in practice? The Deuterium of Canada plant at Glace Bay, N.S., plagued by design problems and salt water corrosion, hasn't produced a drop of heavy water since its completion in 1968. Now the federal government has reached an agreement with Nova Scotia under which Atomic Energy of Canada Limited will assume full responsibility for the plant's rehabilitation and eventual operation.

But other heavy water installations, notably the United States Atomic Energy Commission's Savannah River Plant in South Carolina, in production since 1953, and the Canadian General Electric plant at Port Lawkesbury, N.S., have provided valuable information to AECL, owner of the Bruce plant, and to the Ontario Hydro engineers who will begin to operate it in the latter half of 1972.

AECL and Hydro selected the site between Port Elgin and Kincardine for a number of reasons. The Bruce heavy water plant will require plentiful supplies of process and cooling water (Huron is one of the coldest of the Great Lakes) and much of the initial 20-ton-a-year output is destined for the



Bob Icely: H₂S? Tame as a kitten if you keep it where it belongs.

nearby Bruce generating station's four 750-megawatt reactors, due for commissioning between 1975 and 1978.

In addition, Hydro already owned large tracts of land at the site, which adjoins Douglas Point nuclear station. These three plants, together with the oil-fired auxiliary steam plant which will supply process steam for heavy water production, comprise the 2,300-acre, billion-dollar Bruce nuclear power development.

If there was ever any doubt about CANDU's efficiency, it has been dispelled. After more than four years of service, the Douglas Point station has chalked up an excellent operating record. And, ahead of schedule, two 540-megawatt nuclear units at

Pickering generating station are already pumping power into the Ontario Hydro grid. Pickering, on Lake Ontario a few miles east of Toronto, will also draw on the Bruce plant for heavy water.

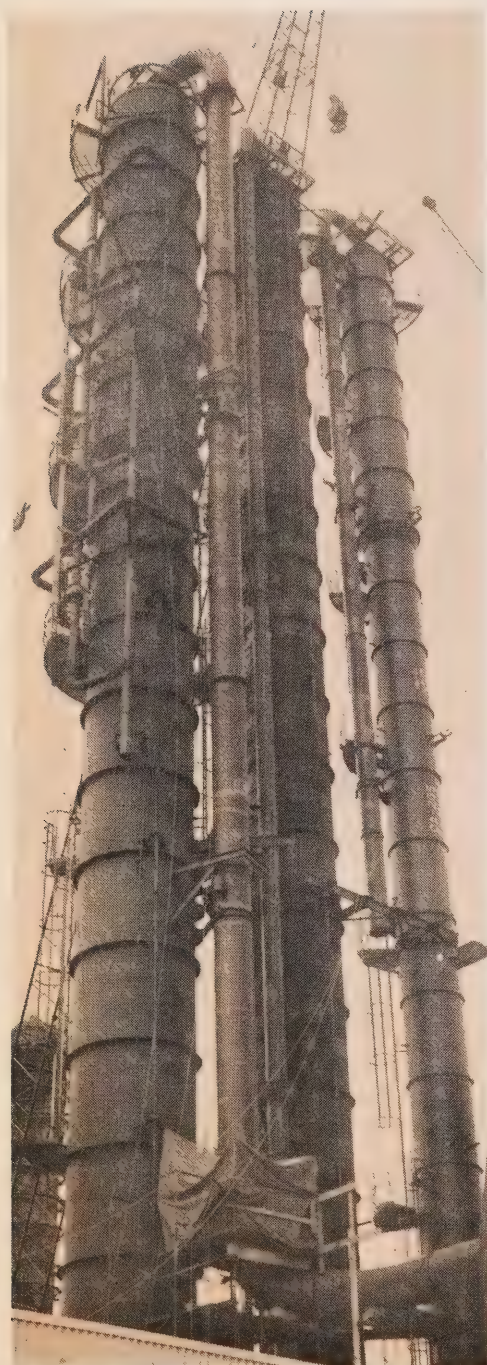
So Canada's billion-dollar bet on a nuclear system it could call its own has paid off. The only question is: will we have enough heavy water for the reactors? AECL predicts the cumulative heavy water demands for CANDU reactors in this country and abroad will be well over 5,000 tons by 1976. (Each of the four reactors at Bruce generating station, for instance, will require 670 tons.)

Although there may be a temporary shortage, AECL is confident there'll be enough heavy water to satisfy CANDU's thirst during most of the 70's. After that, Canada may have to build another large heavy water plant. By the 1980's, though, there may well be new technologies for producing D₂O — hydrogen-amine exchange and hydrogen-water exchange are two processes now under study.

Hydrogen sulphide is not without its problems. The "rotten egg" gas, familiar to high school chem-lab students, is a natural ingredient of "sour gas" which is normally separated at petroleum refineries; H₂S supplies for Bruce will come from the Thio-Pet plant at Fort Saskatchewan, Alta.

Used extensively in industry — particularly nickel extraction, pulp and chemical processes — hydrogen sulphide requires special handling because it is toxic, corrosive and flammable. But it's not difficult to detect: a white ribbon of lead acetate film turns through brown to black when exposed to H₂S concentrations as low as one part per million.

If traces of the gas were present in holding lagoons, where discharge water will be kept before being returned to Lake Huron, it would be aerated, oxidized to heavier



elemental sulphur and precipitated from the effluent.

"It's like having a fire extinguisher in the home — we take precautions and training we never expect to use," says Mr. Icely. "All employees at Bruce nuclear power development, from secretaries to operators, from managers to engineers — about 3,800 of us — will receive chemical protection training."

Heavy water producers take almost incredible safety precautions embracing employee training, specifications, regulations, material quality and operating procedures. "Another factor is that the plant is designed to keep the gas continuously recycling inside the system, acting as a transporter of deuterium," Mr. Icely adds.

The Bruce plant will have an inventory of about 1,400 tons of H_2S — 600 tons in each of the two 30-storey enriching units, the remainder in reserve tanks. These storage "bullets," high-pressure insulated tanks, have the capacity to suck back and liquefy all H_2S in an enriching unit — an extra safety precaution in the event of sudden pressure changes in the towers.

Small trace leaks of H_2S could be drawn to the flare tower to be burned off. "Some gas will be lost, chiefly through corrosion, reaction with oxygen and construction materials, so we'll need one or two rail tank cars a year of make-up gas," says Mr. Icely.

As with all operations that may affect the environment, Hydro works closely with the regulatory bodies concerned. The Ontario Water Resources Commission, the federal Department of Health and Welfare and the provincial Department of the Environment set stringent safety and environmental standards.

Before the first bulldozer moved a stone,

building specifications and safety plans were co-ordinated with the Atomic Energy Control Board, local councils, provincial police, health authorities at every government level, the OWRC, and a few others besides.

An avid skier and sailor and a concerned environmentalist, Bob Icely takes the time to explain heavy water extraction to community leaders and neighbors in Port Elgin where he lives with his wife, Berneice, and their four school-age children ("the kids keep me on my toes with questions about 'my' plant").

He feels that industry has an obligation to show that a plant is safe — safe to people, plants, fish, the environment. Bob Icely is convinced, and he has the credentials to convince others, that the Bruce heavy water plant is friend, not foe.

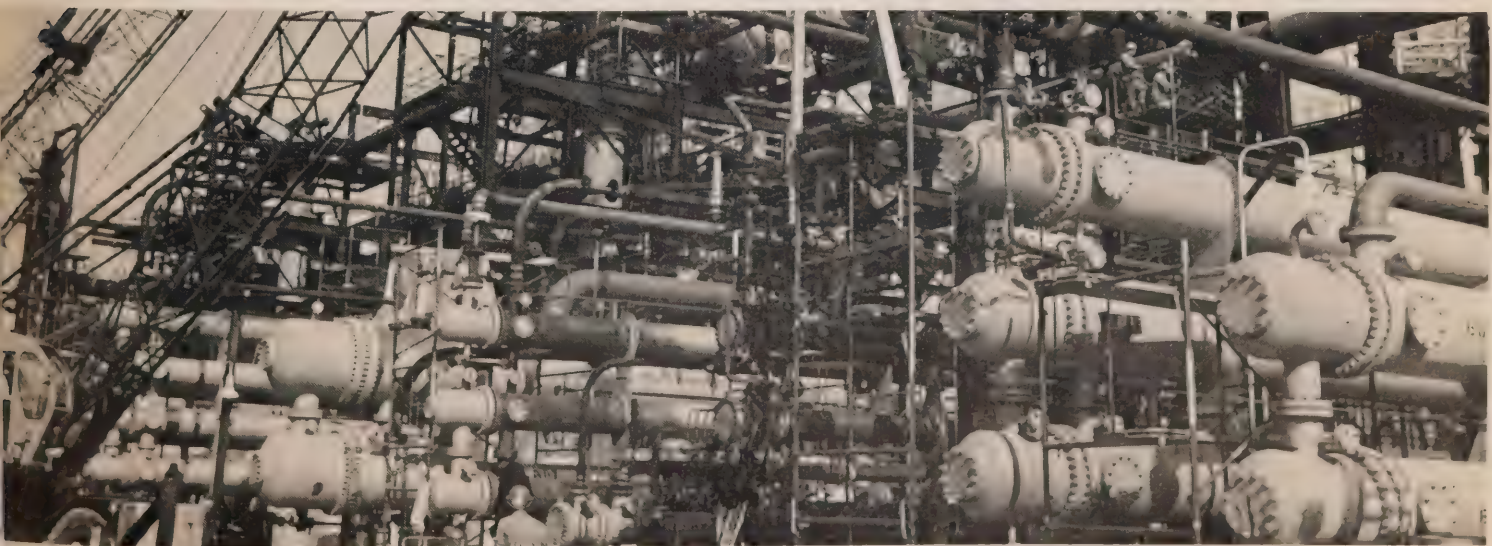
Born in Norwich, England, 46 years ago and a graduate in mechanical engineering at London's Borough Polytechnic, he spent the 20 years since he came to Canada handling "delicate chemicals."

At Union Carbide's chemical and plastics division at Montreal and Belleville, and the Domtar (Petrochemical) chlorine plant at Beauharnois, Que., he learned the fine points of chemical processing and protection. "The top people here at the plant have an average more than 10 years' experience handling hydrogen sulphide gas and chemicals."

Recruited almost three years ago by Ontario Hydro, Mr. Icely spent 18 months at the Savannah River Plant in South Carolina studying heavy water production.

When it's operating 24 hours a day, year round, the highly automated Bruce plant will require a staff of 200, including technicians, engineers, maintenance men, management and supervisory personnel. So, after construction started on the plant in 1969, Mr. Icely began recruiting employees.

view looking north over the Bruce nuclear power development shows the original Douglas Point nuclear station in the foreground and the heavy water plant. In the background, the cranes used to pour concrete at the huge Bruce generating station are visible. Photograph below shows the heat exchangers at the base of the heavy water plant's enriching unit. Left, the distillation towers of the finishing unit.



Chimney stack on left is part of the oil-fired plant that will deliver steam to the heavy water installation.



enced personnel from across Canada the chemical, refining, petrochemical and allied industries "because Hydro was to chemical plants."

Now these specialists, in turn, are training operators and technicians in chemicals handling and quality control. ("Every pound of heavy water costs between and \$30 so we can't afford to lose a few drops an hour, even to evaporation.")

Plant employees are trained to take special precautions with H_2S . At the receiving and storage areas where the gas is transferred from rail tank car to the storage bullets, and around the enriching towers, they employ the "buddy system." Equipped with air canisters, they travel in pairs at a specified distance from each other. If an employee were affected by gas, the other would don his air pack mask, sound the alarm and render first aid to his buddy.

Railway workers, too, are experienced in handling materials and chemicals more problematical than hydrogen sulphide. Because of precautions taken in transit, because Thio-Pet has only five of the specially constructed tank cars, Bruce receive only two or three cars of liquefied H_2S at a time, beginning in early 197

Chemical movements by rail are followed every mile of the route by CN and the supplier. Handling procedures are regulated and carefully supervised by the Canadian Transport Commission. Citing there have been no serious railway mishaps involving hydrogen sulphide — just as there's never been a serious H_2S accident at a North American heavy water plant.

As Bob Icely puts it: "It's like the ammonia in the old type of refrigerator — keep it inside where it belongs, and it's as tame as a kitten." □

at the flick of a switch . . .



TOYLAND

by Susan Goldenberg

photos by Ron Brown

Toys are as much a part of the festive season as Santa Claus, bedecked fir trees, candy canes and snow. But toy manufacturing is a \$250 million year-round business that has increased by 8 to 10 per cent over the last decade — a sign of growing consumer affluence.

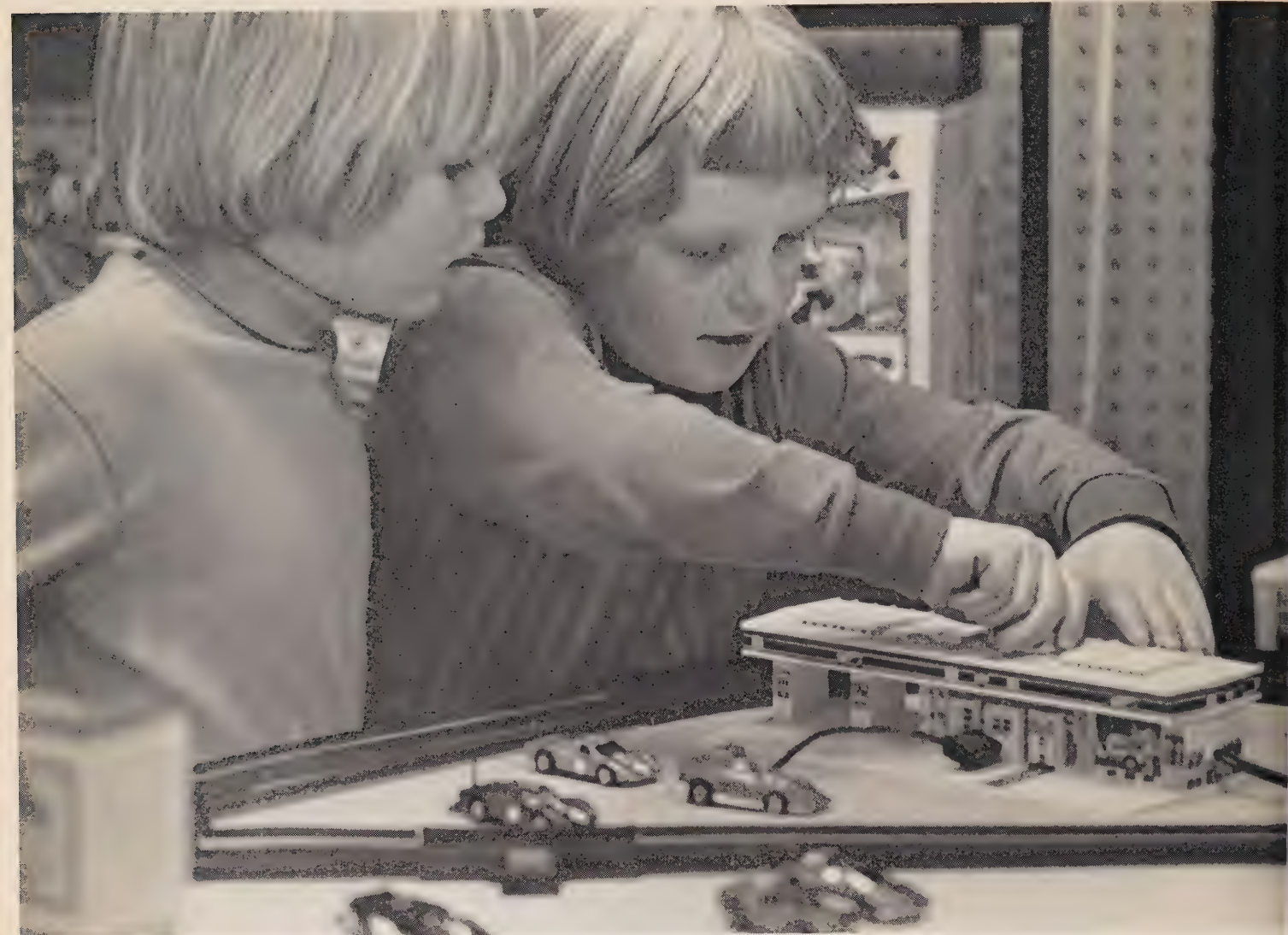
Although they are grateful to Santa, the toy manufacturers have steadily reduced their dependency on him with summer and birthday toys to flatten out their sales curve. As a result, Christmas sales come to only 60 per cent of the total. No little elves slave through the summer to churn out these Christmas goodies. Instead, those toys which have sold well during the year, or are more expensive, are promoted at this time.

Toys are as old as man himself. Some of the earliest were made of natural materials, with rattles and balls being shaped from gourds, and birds or animals from fibre,

dried grasses, or bark. Modern toys, by comparison, frequently leave less to the imagination and are often highly-sophisticated devices driven by electricity from either the power supply or dry cell batteries.

Electrical toys can be traced to early civilization's water-driven toys. The reign of Hero of Alexandria, 100 years before the birth of Christ, saw a bird that sang and piped by means of moving water. Such devices inspired the automata toys that emerged in the early Renaissance period and remained the rage among the nobility in Europe until the 19th century. They included musical boxes and dolls, which when wound up, pulled or pressed would blow bubbles, play a tambourine or walk. Thomas Edison, in the latter part of the 19th century, is credited with developing the first talking doll by placing his new invention, the phonograph, inside it.

from racing cars to telephones, electric toys reflect the tempo of modern living



Because of their intricacy and individual production, automata toys were very expensive, and could not be enjoyed by the vast majority of the population. Thus, the development of the dry cell battery in the 19th century opened a whole new vista. In their most simplistic form as tiny motors, these new toys were used by turn-of-the-century North American educators to teach their students about electricity.

Ontario Hydro's historical collection in Etobicoke includes a few of these and similar antiques. One of the most popular toys of this type was a hand generator set. By holding two electrodes while turning a handle, children could experience the excitement of a slight electric shock.

"Modern electric toys are popular because they provide speed and continuous action and don't have to be pushed around," says John Arnold, director of merchandis-

ing in Toronto for Mattel Toys.

His point is well illustrated by the variety of electric toys on sale this year.

For girls, there is Dawn Doll, a newcomer whose life revolves around her battery-operated possessions. After having her long, blonde hair washed in her own beauty parlor and being dressed in one of 40 swinging outfits, Dawn may get a call from her agent on her battery-operated phone that she is to appear in a fashion show. She can speed to the show in her racy, battery-operated sports convertible and then show off her clothes on the circular rotating, battery-run stage. When she gets home, Dawn can then nibble on the cookies and cakes made in her owner's baking oven.

For boys, their fathers and grandfathers there's that good old standby, the electric train. Station sets, scenic material, bridge tunnels and several variations of track and accessories can also be purchased.

This year, aviation and car racing buffs are being catered to with supersonic planes and Indy 500 racers, which can be "driven" on winding, tricky tracks. Both types of toys may be connected to either the power supply or battery.

And one hot-selling item features model racing cars with built-in motor and battery. All they require is a 90-second "pit stop" at a special charging unit.

Toys like these are the cream of a large crop through which manufacturers must sift each year for their final choice. "Out of 1,000 toy suggestions each year, we might make 20 and only four or five of these would really catch the public's fancy," says Ed Hirst, of Irwin Toys. H-



over, the problems of duplication of the idea by another firm and getting the jump on competitors rule out nation-wide testing.

Manufacturers gauge a toy's potential popularity by first determining the market, then developing the toy and testing its attractiveness by either asking youngsters whether they would like it or inviting a number of children to a test centre to get a first-hand reaction. Sometimes, this is followed up by home-use tests. Most toys and games enjoy peak popularity for about five years, although there are ones like Monopoly which never die out.

While some toys may cost as much as \$50, manufacturers try to keep their prices under \$10. This doesn't affect profits, though. Lower prices make it possible to buy more toys and some items, like

dolls or train sets, require the purchase of accessories.

Safety is a major concern of toy manufacturers. Non-electrical toys get a thorough testing by the firm. Electrical ones are scrutinized by the Canadian Standards Association, a non-profit organization which tests the safety of home and industrial products. No cord-connected electric toy should be on the market without CSA approval. The CSA is currently re-examining the whole area of electric toys.

The CSA makes sure that enclosures housing the electrical components aren't large enough for children to insert their fingers. It also watches out for toys that could be pried open either manually or by such household tools as screwdrivers.

Plastic toys are tested to ensure they won't catch fire. A toy's capacity to withstand severe impacts without becoming an electrical hazard is tested by throwing a steel ball against it and by dropping the toy on a hardwood floor. Possible current leakage is checked, too, while a warning is affixed if the toy tends to heat up considerably.

However, the association stresses that the final responsibility for buying safe toys lies with parents. "Parents must look for warnings of possible hazards because children aren't always cautious and sometimes they can't either read or interpret correctly," says Ray Smith, head of CSA's appliances section. "In addition, they should make certain that a toy intended for an older child doesn't get into the hands of a toddler."

THE GATINEAU GANG

1929

by Geoff White

Reunited they s

They stood in small groups this evening in neat suits, ties, pressed shirts and polished shoes. Not a man was under 60. They were big, bronzed men with large hands who were chosen to do tough work when they were younger because they had the muscles and stamina to see it through.

They watched a series of black and white slides and they saw themselves again. Young men in shirt sleeves and bibbed overalls cursing, wheedling and cajoling a struggling team of horses or muffled against the sub-zero while they spliced two giant conductors.

Who were these men, who were reliving days long gone? Living again the gaudy days of the Roaring Twenties and the shabby, Dirty Thirties?

We are the Gatineau boys, they said.

"We were the boys from the farms and from the lumber camps, and to get a job with Hydro was something to aim for," said Lorne Hartman, one of the lucky ones who became a 45 cent-an-hour lineman. "They picked up staff along the route of the line. I was hired on the spot at Ardagh and became a lineman right away. No training. You either climbed and did the job or you didn't work."

Lorne is typical of those who from 1926 to 1931 tackled what was then Ontario Hydro's largest line building project – the Gatineau line.

The suit and tie occasion was a reunion at Peterborough and those who are left were building the lines all over again and remembering what "John the Finn" said and what "Blackjack" McKinnon did and how deep the snow was that year and how bad were the black flies that summer.

The Gatineau line was urgent and the men who built it worked on a tight, relentless schedule.

By the mid-1920's, Hydro was having problems in meeting the growing demands

for power. The HEPC, as it was more commonly called in those days, was about 20 years old and private interests and a large political faction still bristled at Sir Adam Beck's effrontery at the establishment of publicly-owned "People's Power."

The rankling was as rife in the United States against public ownership as it was in Ontario and one of Sir Adam's dreams was the development of the international waters of the St. Lawrence River. His opponents, among them the railway companies who could see their business drifting to the suggested waterway, mustered stubborn resistance on both sides of the international boundary.

But at the Peterborough reunion they didn't talk about the political situation or the power shortages of the 1920's. They remembered only the way they lived and struggled and made their muscles ache. They remembered the steel they had carried and the cable drums they had rolled and such men as Pete McVicar, a property agent who was able to persuade land-owners that they could not change the centre line as "kilowatts won't go around corners."

To them, Hydro's search for power meant little. Many of them came from homes which in those days didn't have electricity, anyway!

Hydro had investigated the St. Lawrence as a potential power source as far back as 1913, and in 1921 had submitted a plan to the International Joint Commission for the production of 1,635,000 horsepower as a joint Canada-U.S. project.

But the idea was born too soon, and it was not until 6.39 p.m. on July 5, 1958 – 33 years after Adam Beck's death – that the first revolutions of the turbines at the Robert L. Saunders-St. Lawrence GS were to fulfill his dream and prove his foresight.



d as they talk about the line that muscles built



So, having to forego power from the St. Lawrence and with interprovincial treaties blocking the development of the Niagara and Ottawa rivers, Hydro in the mid-twenties started a hungry search for power.

And while Ontario was power-poor, Quebec was somewhat satiated. But it was in the hands of private companies: the Gatineau Power Company, which was generating on the Gatineau River; the Maclaren-Quebec Power Company; and the Beauharnois Light, Heat and Power Company.

A kilowatt being a kilowatt, whether generated by public funds or private, there was no more obvious solution than that Quebec's surplus should fill the void in Southern Ontario. In 1926, a contract for the supply of 80,000 horsepower was signed with the Gatineau Power Company for delivery in 1928 at the Quebec-Ontario border. Further contracts followed.

So the power was there in Quebec; the demand was waiting in Ontario. Only one thing was missing – the line to carry the power. The Gatineau line.

"I was on the job in 1926 as a member of the survey team," said Vern Clapp, now retired. "We worked from aerial photos, the first time it was done. We worked out of camps – tents, not huts – and if you really want to know what winter is all about try living in a tent up on a right-of-way 50 miles from nowhere.

"We had stoves, of course, and all the wood we could burn, but . . ." and he looks at you knowing that you don't really understand. "You really have to experience it to know what it is like," he added.

The new technique of surveying with the aid of aerial photographs, taken from

Old photos taken from the files of the Gatineau line record vividly the lifestyle of the men who sweated and cursed their way from the Quebec border to Toronto . . . the well-stocked kitchen, the drafty bunkhouse, transporting stone fill by raft, digging through swamp and the survey teams which lived under canvas and worked from the new technique of aerial survey photography.

10,000 feet, did much to cut down on the time, and time was of the essence.

Until then, Hydro's top transmission voltage had been 110,000 volts. Because of the amount of power the lines would have to carry and the distance involved, the Gatineau would be twice this voltage and new design, new techniques, and new work methods had to be evolved – not to mention the building of Leaside transformer station, Hydro's first 220,000-volt station (later to become 230,000 volts).

It was almost brutal the way they roughed it and drove themselves to bring the towers and the cables from the Ottawa valley to Leaside.

"It was so draughty in that damn hut there were whitecaps on the washbasin," one of them was heard saying. "Old Sam Koval said, 'When I get up in the morning, all I have to do is take my mitts off and I'm ready for breakfast.'"

And the breakfast would have been good, as were all the meals. Men who worked as they did from 7 a.m. to 6 p.m. six days a week needed lots of fuel to keep them going. Hydro saw that they got it.

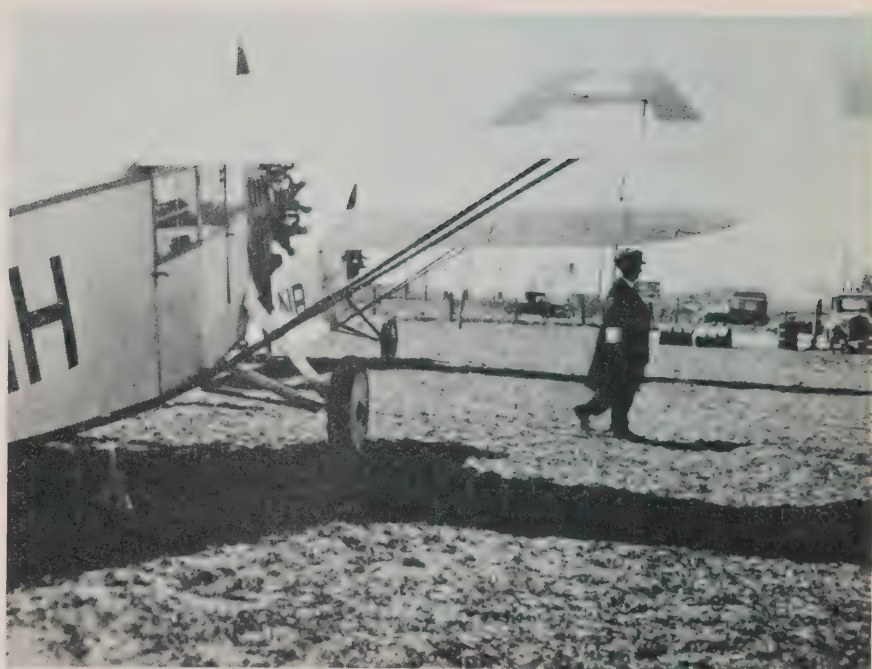
Board was \$1 a day; wages from 35 cents an hour up.

Sanitation, it seems, was not on the same level as the meals, at least not according to a scrap of conversation overheard from one of the groups. "Some of the men in the hut were scratching pretty badly," said the voice, "and when we told the foreman all he said was, 'I must get that goddam teamster out of there. He needs both hands to drive the horses.'"

Foremen were somewhat practical in their thinking.

Whether that particular teamster was Stoney Whitwell or not wasn't said. Stoney was the man who, when told his





horse team could be taken the 300 miles to their home by rail, turned down the offer because he thought they might not like travelling by train. He walked them back in 15 days.

The struggling, sweating teams were all-important to the steady drive of 2½ miles of tower line a week.

"It was tough," said former lineman Ward Ellis. "Sometimes there were spots even the teams couldn't reach and then we carried the material in on our backs. Tractors were introduced during the job, but we built that line with muscle power."

And muscles got it through on time. The first line was started on September 21, 1927, and was in operation on October 1, 1928. Then they started all over again with the second line, and then the third.

Hydro's Annual Report for 1927 says: "Power under this contract (the Gatineau) will relieve the shortage in the eastern part of the province until such time as the rights of the St. Lawrence and the Ottawa are determined and power developments can be undertaken."

It was to be a long wait, a very long wait, and the Gatineau was worth it.

Many of the men who built the line stayed to make Hydro their career – like the four Yearwood brothers, three of whom were at the reunion. Nine of the original gang are still on Hydro's active payroll.

In all, about 45 turned up to relive those tough, driving days. And then, between the reminiscing and the boisterous back-chat, the handshaking and the back-slapping, these veterans of the Gatineau stood a moment in silence and thought of those they wouldn't see again. □



the gatineau
gang/1971

Where Time Flies

by Les Dobson



London Free Press photo

Reg Thorn with the pride of his collection, a Tompion long-case grandfather clock worth \$38,000.

Time is a precious commodity to Reg Thorn. As head of a large travel trailer and mobile home firm with eight plants across Canada and one in Australia, he follows a busy schedule of plane-hopping, boardroom meetings, and keeping 800 employees on their toes.

But time takes on a different aspect when the president of Glendale Mobile Homes Ltd. leaves behind the world of balance sheets and sales curves. Then it's an occasion to relax in a soft leather armchair and absorb the gentle lullaby of 160 different watches and clocks.

There are stately English grandfather clocks dating back to the seventeenth century, exquisite French mantel clocks decorated in cloisonné or encased in ormolu, gravity clocks, ships' chronometers, bird clocks that announce the hour with tiny chirping creatures flaunting busy beaks and flapping wings and carriage

clocks that accompanied their owners on dusty, jolting journeys long forgotten.

Scattered around the burglar-proof, fire-proof room, which Mr. Thorn has built 14 feet below the garden of his comfortable, rambling home three miles from Strathroy, are books with such esoteric titles as "Weight Driven Chamber Clocks of the Middle Ages and Renaissance" or "Pennsylvania Clocks and Clockmakers." Engravings of master clockmakers John Harrison and George Graham gaze bewigged at the collection, termed by an official of the Royal Ontario Museum as "one of the best in Canada."

Busy as he is, Reg Thorn will always make time to talk about his collection, which he began about three years ago. His well-tanned features radiate enthusiasm as he delves through his growing library and his



big practical fingers belie their size as he takes a screwdriver and makes hair-fine adjustments to a centuries-old mechanism.

"The best 17th century clockmakers were English or Dutch," he says. In France, the revolution interfered with the development of clocks and the Swiss didn't gain prominence until much later."

Mr. Thorn's collection includes clocks by seven of the most famous clockmakers of the late 1600's: Thomas Tompion, Joseph Windmills, Christopher Gould, Daniel Quare, Daniel Delander, John Knibb and Simon Bartram. His pride is a Tompion long-case grandfather clock, valued at \$38,000. While its mellow lines are reminiscent of an ancient and loved violin, it's in perfect condition and has not even been restored. "It probably stood in a corner for years and was never wound," says Mr. Thorn.

Many of the clocks were picked up on business trips. "All the chronometers came from Australia — I was there twice last year," he says. "If I have a few hours to spare, I'll go around the dealers." Until John Harrison invented the chronometer

in the mid-1700's, sailors had no way of measuring longitude. One of Mr. Thorn's books contains letters from grateful mariners testifying to the accuracy of instruments of that vintage.

It's not only chronometers that have seen the action, though. A handpainted Rimbault, dating back to 1780, ticked away many years in Peking until it was stolen during the Boxer uprising in 1901. Years later it turned up undamaged in London and was auctioned by Sotheby's in 1959 to an Australian buyer for 850 pounds. Mr. Thorn bought the clock on one of his visits "down under."

Among later but nonetheless intriguing specimens is a grandfather clock that has to be the granddaddy of the jukebox. For the modest sum of one penny, habitués of English pubs around the turn of the century could listen to such latter-day hits as "Cavalleria Rusticana," played on the clock's chimes by a set of interchangeable metal discs.

The collection also contains an equation clock, built to keep time with the sundial.

"It didn't take the early clockmakers long to discover that, with 24 equal hours, the clock is in phase with the sundial only four days a year," says Mr. Thorn. "The equation clock incorporates the basic mathematics of the earth's rotation and path around the sun into a cam, which lengthens and shortens the pendulum according to the time of year."

It was almost by accident that Mr. Thorn became interested in horology. He was planning to redecorate a recreation room which had contained an indoor swimming pool and a friend suggested he fill nine arches in the room with grandfather clocks similar to one he had purchased a few years before.

But antique grandfather clocks were harder to come by than he thought. First after some searching, he heard of a collection for sale in Halifax and quickly snapped it up. "I soon found there was more to clocks than most people imagined and became fascinated by the subject," he says.

Mr. Thorn's underground room is connected to the house by a long staircase and has an escape hatch into the garden.



ent anyone is accidentally locked in or breaks out in the house. "The insurance a collection like this would be astronomical," he says. "This room is my best insurance."

the top of the stairs is a workroom containing still more clocks and some Chinese bric-a-brac, including a jade teapot and such personal effects as fingernail covers and gouge scrapers. "I picked them up in Winnipeg while looking for a clock," says Thorn with a grin. "Occasionally, I carried away."

Thorn first set up business in Hull, England, back in 1936. "I started out buying five house trailers and two plywood airplanes called Flying Fleas," he says. He's now one of the leaders in the private mobile home market and is expanding the already sizeable plant at his corporate headquarters in Strathroy to keep up with expected demands.

ed whether the mobile home boom will continue, Mr. Thorn reflects a little uncertainly. "I certainly hope so," he says. "At least, I will tell."

Whenever his busy schedule permits, Mr. Thorn loves to spend time tinkering with his collection. Left, a corner of the underground room in which he keeps his timepieces.

...and then there's the electric clock

Although a patent was taken out on an electric clock as early as 1840, the timepiece as we now know it had to await the arrival of large, integrated power networks producing alternating current.

One of the most common models, the synchronous electric clock, is powered by a small motor governed by 60-cycle AC in much the same way as the oscillating balance wheel regulates a watch.

For normal household purposes, the synchronous clock is accurate and reliable enough. But it is entirely dependent on the reliability of the power supply and the degree to which the utility can maintain the frequency of the current. If, for example, the consumer load in Ontario exceeds the amount of power being generated, the frequency drops and all electric clocks connected to the system will run slightly slower. If generation exceeds consumer load, the frequency tends to increase and the clocks speed up.

Because it belongs to a large interconnected system extending from James Bay to the Gulf of Mexico and from the Atlantic Ocean to the Pacific, Ontario Hydro is able to keep the fluctuations between supply and demand to a minimum. Nevertheless, differences between exact time and electric time do occur and these are controlled to plus or minus two seconds.

Responsibility for this task falls on the Ohio Power Company, which initiates orders to speed up or slow down generation throughout the interconnected system once an error of one or two seconds has accumulated.

Where great accuracy is required, usually for scientific purposes, there is a family of electronic clocks employing tuning forks or quartz crystals as governors. A carefully-made tuning fork will vibrate at a very precise frequency within the audible range while most quartz crystals used in clocks vibrate around 100,000 cycles per second. The current controlled by these means is amplified electronically and divided to produce a pure AC of the desired frequency.

Electronic clocks find application in observatory work and also as calibration devices.

Still greater accuracy may be achieved with clocks regulated by the natural vibrations of the molecules of ammonia while the cesium beam atomic clock at the National Bureau of Standards in Washington, DC, has a potential accuracy of one part in ten billion, equivalent to an error of one second in 300 years.

Cesium clocks are not true clocks, but are used in generating precise frequencies with which to measure other frequencies. They are available commercially, but may cost in the region of \$500,000.

hydro's role in jobs market

district 8



Some of the men who will lead District 8 of the OMEA for the coming year include, standing, H. T. Ross, Sarnia; Carl Phair, Blenheim and T. S. Anderson, Windsor. Seated, W. A. Rose, Petrolia, secretary-treasurer; M. J. Huddleston, Petrolia, president, and Fred DeSantis, Kingsville, second vice-president.



A quarter-century of community service by Leamington PUC commissioner Lawrence Graham was recognized at the District 8 meeting with the presentation of a set of sterling silver cufflinks. Leamington Mayor Ralph Nicol, left, watches as OMEA President Andrew Frame makes the presentation.

district 8

4200 firms on shopping list

Ontario Hydro believes it has a responsibility to foster employment in its own province, says Dr. J. D. Fleming.

Speaking to delegates at the annual meeting of District 8 of the OMEA in Kingsville, the Ontario Hydro commissioner said that during 1970 Hydro's purchases amounted to about \$572 million, with close to 60 per cent of the dollar value placed in Ontario.

Dr. Fleming said more than 4,200 firms shared the profits from Hydro's shopping list last year, with 82 per cent of the dollar value, excluding fuel for thermal stations, being placed in Canada.

Standing in for Hydro Chairman George Gathercole, Dr. Fleming said power demands within the District 8 area are keeping abreast of the provincial average with approximately 2½ billion kilowatt-hours being consumed in the region last year.

However, with the "frigid and declining economy" this year, Hydro expects its demands for electric power to be lower than in recent years.

But, he added, Hydro "will be in the best shape it has been in for several years to meet the winter peak." He attributed the improved reserve position in part to the excellent performance of the Pickering nuclear power station.

Dr. Fleming said Hydro is considering improvements to the J. Clark Keith coal-burning plant at Windsor to reduce air pollution. He also described new tower lines of an improved appearance that will be erected in the province. One of the first will be built in the London area.

He predicted such measures "will cost us all more for our power in time to come."

Burn garbage for power?

The OMEA will be asked to petition Ontario Hydro to consider the feasibility of using its coal-fired J. Clark Keith generating station at Windsor as a pilot plant for the use of garbage as a fuel to produce electricity.

Delegates endorsed a Windsor Utilities Commission resolution calling for the conversion of the Keith plant "for the clean, pollution-free disposal of garbage through its conversion into electricity."

The resolution further called for the reclamation of scrap metal, glass and road-building materials for recycling.

Windsor Utilities Commission suggested a "tremendous amount of heat energy in the form of garbage is being buried in the ground at great cost and waste of land." It further suggested that a process of extracting this heat has been developed and is being used to produce electricity in Europe.

Extremely costly pollution controls are needed at the Keith plant, Leamington's Mayor Ralph Nicol said, when he presented

the resolution. He added that Ontario Hydro has said in a public statement it was attempting to phase out the plant, therefore it would be ideal as a project for producing electricity from heat energy contained in garbage.

Delegates also endorsed a Leamington PUC resolution asking the Ontario Municipal Employees Retirement Board to permit the purchase of its supplementary pension plan for employees, effective the year the utility applies to enter the supplementary plan.

The utility pointed out that under present regulations, the OMERB requires full payment for back-service credits, either to the date of employment or back to the date the utility entered the system. In cases that would be January 1, 1966.

It was suggested that back-service could be prohibitive for some of the small utilities and the district executive will draft the resolution to include a clause calling for the consideration of a sharing plan with the employee.

'Robbing kids of childhood'

Windsor's Mayor Frank Wansborough called for an end to organized sports youngsters in the five to eight-year bracket, claiming "over-organization is robbing kids of their childhood."

Mr. Wansborough deplored the attitude of many minor hockey league coaches toward their players. He said: "I

District 7



Members of the District 7 executive shown with OMEA President Andrew Frame are, standing, Ross Fewster, Ingersoll; Murray Greene, Exeter; Andrew Frame and J. L. Thomas, London. Seated, Gordon Hess, Zurich, second vice-president; Robert Austin, Arkona, president, and F. T. Julian, Woodstock, first vice-president.



Service to utilities in the District 7 area was marked at the district's annual meeting when OMEA President Andrew Frame presented 15-year certificates to I. H. Rader, Dashwood, and R. J. Risdon, Thorndale.

aches, who aren't even coaches, have such selfish desires to win — to accept all the glory — that the youngsters are the ones who suffer."

Mr. Wansborough said he overheard a tape recording of a "non-coach" giving pre-game talk to a team of eight-year-olds in which was said: "If there's blood, it'll be on their sweaters, not ours. Cream the bums. Go out there and kick the . . . out of them."

And he criticized the way in which teams in the metropolitan areas vie for players. "Sport," he said, "is over-organized and at the wrong age group. Sport for children in the five to eight years of age bracket is wrong and must be changed to protect our youth."

"As a police commissioner, all I have to do is pick up the arrest sheets in Windsor. Most of the youths in trouble are in the 15, 16, and 17 age bracket. There's nothing to do for them to do. Having been forced to participate in organized sport from the time they're children, they're just plain fed up with it," Mr. Wansborough said.

"After all, when a seven-year-old travels all over the world to participate in a world championship tournament in the U.S., and happens to play on the championship team, where else is left for him to go?" Mr. Wansborough asked.

"From five to 12 years of age, kids could be learning the fundamentals of all games and having fun — not playing in a league where winning is almost as important as it is in professional sport. We must de-emphasize the sport aspect of games and place all the emphasis on the

recreational aspects.

"If the schools across the province are thinking of doing away with the grade system — doing away with the competitiveness — surely there's no reason why we can't do away with the same competitiveness in children's sport. By not doing so, we're doing the kids a disservice. We're robbing them of their childhood," Mr. Wansborough said.

The mayor himself is a former basketball player and coach. □

district 7

Inflation eats at savings

The cost of living during the current inflationary period is causing people's savings to be eroded away, and it's "an unjust and inequitable system" that permits this to happen, Ontario Hydro Chairman George Gathercole told District 7 OMEA delegates in Woodstock.

Mr. Gathercole said that wage increases of 7 and 8 per cent are quite common, forcing industry to raise its prices to the consumer.

"Despite increased wages and salaries," Mr. Gathercole said, "the improvement in average productivity is only about 2 to 2½ per cent, and as a result consumer prices continue to rise."

Mr. Gathercole added that this increased cost of consumer goods is magnifying the problems of the Hydro enterprise. "People

have been so accustomed to electric rates decreasing in years gone by that they are not aware of the fact that utility costs are rising at a very rapid rate.

"In the past we were able to stabilize our rates, but not now. And that's because costs are rising much more rapidly than ever before to both Ontario Hydro and the municipal utilities," Mr. Gathercole said.

Mr. Gathercole said that, in future, Ontario Hydro will be using "prodigious quantities of natural gas to fuel thermal-electric generating stations, a fact that will add greatly to fuel costs, but is a means to help reduce air pollution in the province."

He expressed the hope that the OMEA district meetings throughout the province would generate more enthusiasm for the Hydro in Ontario movement and would help to bridge the understanding gap between Hydro and the people of the province.

Mr. Gathercole cited a definite need for people to be educated in the problems of both Ontario Hydro and the associated municipal electric utilities. And, more importantly, Ontario Hydro and the municipal utilities must come to understand the problems of the people.

Among the highlights of the meeting was a utility problems session in which panelists thrashed out questions ranging from tree trimming and television aerials falling on wires to public relations. In the morning, delegates watched a color-slide presentation by W. E. Lawler, of Ontario Hydro's Richview Control Centre, on the generation and distribution of electric power. □

along hydro lines



Award winners

Submissions by both the OMEA-AMEU PR Co-ordinating Committee and Ontario Hydro were considered among the top three entries in their class in this year's American Public Power Association's public relations awards contest.

The OMEA-AMEU submission was on the "Tell the People" program, which includes public relations guidelines and material to assist commissioners and managers of the municipal electric utilities. The Ontario Hydro entry was on a series of seminars on the urban environment, organized for high school teachers.

Both presentations were packaged in attractive vinyl binders and contained photographs, statements of objectives, methodology and results achieved, samples of material used in the program and letters of commendation. □

No more repairs

After nearly 40 years, Galt PUC is closing the doors of its appliance repair shop and going out of the "fixit" business.

The utility gave up appliance sales 10 years ago and stopped repairing small appliances two years ago. A steady loss in profits was behind the gradual withdrawal, says manager D. N. Durwood. The utility has absorbed a loss on servicing for the past five years.

In addition, says Mr. Durwood, there's a tendency to buy new appliances rather than have old ones repaired. Difficulty in obtaining parts was another factor contributing to the decision.

However, the utility will continue its policy of supplying fuses to customers on an emergency basis when other dealers are closed.

Under a watchful eye

An attractive Parisian mother of four has been under the watchful eye of the U.S. Atomic Energy Commission while visiting Southern California to attend a meeting of the American Nuclear Society.

That's because Mrs. Jeanne Labatut, 50, had to get an AEC licence to enter the U.S. with a tiny store of plutonium-238 implanted in her body.

The plutonium powers Mrs. Labatut's pacemaker, an electronic device that keeps her heart beating at the proper rate. She is the second person in the world to have a nuclear pacemaker and the first to visit the U.S.

U.S. law severely restricts the use of isotopes, such as in pacemakers, hence the need for the special permit to travel in the U.S.

Mrs. Labatut has had a pacemaker since 1968 as treatment for intermittent heart block, a condition in which the heart's natural pacemaker periodically reverts to a very slow beat. For the first 18 months, her pacemaker was powered by batteries that must

be replaced every two to three years. Replacing them is a surgical procedure.

She underwent surgery in June, 1970, to receive her nuclear-powered pacemaker. The tiny supply of plutonium 238 has a half-life of 87 years. Doctors figure it will provide sufficient power for about 10 years without changing.

Speed healing

A University of Pennsylvania orthopaedics research team plans to begin an "accelerated healing" experiment using electric current in the treatment of bone fractures.

The move follows the successful healing of a woman's arm using electric current after the bone had failed to mend for several years under normal treatment. The team has also conducted experiments on animals which have shown that electrical stimulation can almost cut in half the time needed to heal a non-fracture.

Dr. Carl Brighton, associate professor of orthopaedic surgery and director of the six-member research team, says electricity induces bone cells to form faster. "But," he adds, "we really don't know why."

KANUPP's first power

Karachi's Canadian-built nuclear power plant (KANUPP) delivered its first 30,000 kilowatts of power to the Karachi Electric Supply Company. After further tests, the output will be increased to the plant's design capacity of 125,000 kilowatts.

KANUPP's start-up signifies a period of nearly five years of co-operation between Pakistan and Canada to provide power for further industrial development in West Pakistan. Canadian General Electric was the prime contractor, being responsible for the design, supply, construction and commissioning of the plant. CANDU nuclear plant at Rajasthan, India, is slated to go into service in 1972.

Chairman honored

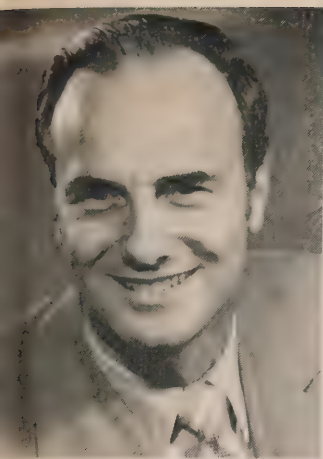


Marking 15 years

Tribute was paid recently to Meaford PUC Chairman Richardson by his fellow commissioners, the town's council and the OMEA to mark 15 years' continuous service to the utility. About half that time has been spent as its chairman.

Among the gifts turned over to Mr. Richardson at a PUC dinner were a golden pen and clock desk set, symbolic of Meaford's "Golden Town" image, a framed photograph of the town's water filtration plant, which Mr. Richardson was instrumental in having built, and an OMEA long-service certificate.

With Mr. Richardson, second from right, are OMEA Secretary Manager Ed Nokes, Meaford PUC Vice-Chairman Don Colwell and Mayor Don Ferguson.



Ted Johnston



Dennis Wilkinson

n employee of Ontario Hydro's public relations division for 23 years, E. A. (Ted) Johnston, has been named public relations officer in Georgian Bay region. He succeeds H. Ivan Lloyd, appointed a senior public relations officer at head office.

Mr. Johnston joined the photo section of the former promotion department in 1948 as a staff photographer. He worked as a staff and senior photographer until 1964 when he was appointed photo features editor. He became a public relations officer at head office in 1968.

During the Second World War, Mr. Johnston was commissioned as a pilot in the RCAF and flew with 429 Squadron of Bomber Command in England. He returned to his tool and die-making trade after the war, but soon began working full-time in photography—an art he developed through an interest in the York Memorial Collegiate Camera Club. A qualified Scuba instructor, his specialty is underwater photography.

In another Hydro appointment, Dennis Wilkinson becomes public relations officer at Lennox generating station, the 2,295,000-kilowatt oil-fired plant being built near Bath. Mr. Wilkinson gained his bachelor of commerce degree at Carleton University and has been a research officer in the PR division for two years. □

Trolleys to stay

Street cars and trolley buses are likely to stay on Toronto's streets definitely as a move to curb air pollution, says Toronto Transit Commission chairman Ralph Day.

Mr. Day says the TTC is reconsidering plans to replace electric surface vehicles in the next few years, citing "changed public attitudes toward pollution" as the reason.

"It's the motorists who don't like street cars, not the people who use them," Mr. Day contends. There are 439 street cars and 12 trolley buses operating on TTC routes.

Warming up

New insulation requirements laid down by the U.S. Federal Housing Authority are now much closer to the Electric Heating Association's "All Weather Comfort Standard," and should make it easier for American utilities to sell the all-electric home comfort concept, says Paul Greiner, technical director of the EHA.

The FHA's insulation standards are a direct result of President Nixon's special message to Congress on national energy policy requiring sufficient insulation to reduce the maximum permissible heat loss by about one-third in a typical 1,200-square-foot home. A similar standard for apartment buildings is also being revised by the FHA and will incorporate the same energy-conservation concept. The housing authority says the apartment standard will

utilize the "envelope" approach and require insulation in all exterior walls, ceiling and floor.

Purpose of the FHA change is to meet the Department of Housing and Urban Development's commitment to national air pollution control and fuel conservation programs.

FHA estimates that the fuel savings which result from the application of the new standards will, in an average climate, equal the cost of the additional insulation required. They would also provide the homeowner with more economical operating cost in most areas. □

More nuclear power

The Canadian Nuclear Association's second 20-year forecast suggests that by 1990 Canada will be operating nuclear plants with a total combined capacity of 35 million kilowatts.

To reach that figure will involve the building of more than a dozen stations the size of Ontario Hydro's Pickering nuclear power plant. This means that Canada will average 1.5 million kilowatts of nuclear capacity a year—the cost will be about \$400 million annually—over the next two decades.

The forecast indicates the importance of increasing Canadian heavy water production. Heavy water for the projected plants would cost around \$1.9 billion. □

Trout in Wales

Some of the most inexpensive, and best, trout fishing in Wales is in the reservoir for the Central Electricity Generating Board's Trawsfynydd nuclear power station. An angler can get a season permit for £6.50 and they've been known to take two-pounders out of the man-made lake at Merloneth.

Brown trout, rainbow trout and perch abound in the waters that are used for cooling purposes at the nuclear station. Rehabilitation work on the lakebed is credited with causing a thick growth of vegetation which provides rich feeding grounds for the fish. Warm water in the outflow channels is helping the plant life to grow more rapidly, improving the feeding grounds even more.

Dinner for commissioner



Congratulations offered

More than 100 utility colleagues across the province's northwest turned out to have dinner with Lou Danis in Thunder Bay in recognition of his appointment as a commissioner of Ontario Hydro.

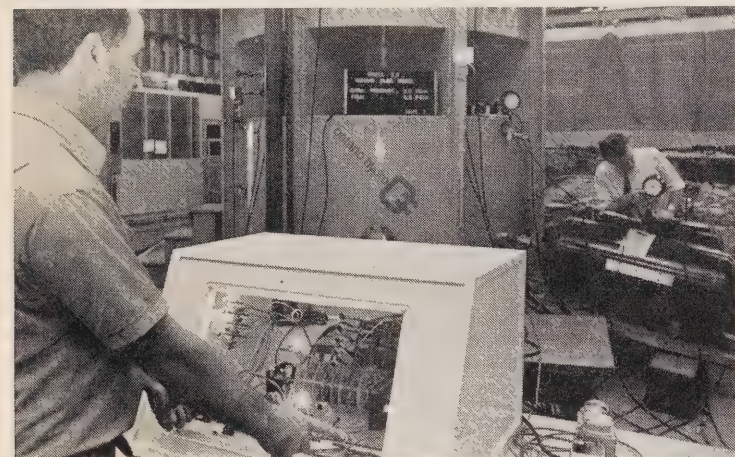
Fellow Thunder Bay Hydro commissioner and OMEA District 3 President Jim Currie, left, presented Mr. Danis with a hand-painted scroll hailing his appointment as "merited recognition by the Ontario government of your dedication and outstanding contribution to your fellow citizens of District No. 3." Mr. Currie

added: "Now your field of service embraces the whole province." Mrs. Adele Laskin, standing in for her husband, Mayor Saul Laskin, turned over a badge of the city of Thunder Bay "in appreciation of the years of service Lou has given to the community and in anticipation of the service he will be giving to Ontario Hydro."

Also on hand to pay tribute to Mr. Danis were OMEA President Andrew Frame, who suggested Ontario Hydro is "in good hands with men like Lou Danis on the commission," Ontario Hydro Chairman George Gathercole, Dr. J. D. Fleming, commissioner, D. J. Gordon, general manager, Don Ireland, assistant general manager — regions and marketing, and local MPPs Jim Jessiman and Jack Stokes.

Mr. Danis is a former chairman of Fort William Hydro and incumbent chairman of Thunder Bay Hydro. In addition, he is first vice-president of the OMEA. □

Mini aids maxi



Scale model

A miniature nuclear power station vacuum building in an Ontario Hydro research laboratory will aid in the design and testing of the real thing at Bruce generating station on Lake Huron.

Technicians at the models laboratory have also simulated the plant's water flow on a Lilliputian scale, building the forebay from treated hardboard and the underground intake from plastic pipe.

"It's not only the building which has to be scaled down, but pressures, velocities and flows," says Wolf Jenkner, in charge of the models lab. He adds that sometimes even time has to be shortened to get the effect of what would happen with the real thing.

Ken Binskin (above), a senior instrument technician who built and now cares for the baby vacuum building, says: "One thing we have had to make allowances for is the vacuum condition. We can't get down as low as the real vacuum building will. The strength of the walls is one factor. Another is that we have testing apparatus inside the model and a small quantity of air leaks through the control cable."

Similar to the one installed at Pickering generating station, east of Toronto, the vacuum building will act as a huge safety valve, sucking in any radioactive material released in the unlikely event of a nuclear accident. □

On advisory group

Ontario Hydro Chairman George Gathercole has been appointed to the province's Advisory Committee on Energy, which will be determining Ontario's future energy requirements and recommending policies and means to ensure those needs are met.

Prime Minister William Davis says the committee is the second step in the government's plan to develop a long-range energy

policy that will benefit both the province's residents and business and industrial communities.

First step in the program was the establishment of Task Force Hydro, which is reviewing Ontario Hydro's "function, structure, operations, financing and objectives."

Green light

The Ontario Water Resources Commission has approved plans for the treatment and disposal of wastewater from the Bruce heavy water plant.

Involved will be a sewer and aerated lagoon system to be built at a cost of \$1 million. It will be designed to prevent the release of excessive quantities of hydrogen sulphide in the spent process water.

In the production of heavy water, light water is reacted with hydrogen sulphide to extract small amounts of naturally occurring deuterium oxide. The hydrogen sulphide is then recovered, and traces remain in the process water.

municipal briefs

The office walls of Belleville Utilities Commission and Ontario Hydro's Eastern Region headquarters are sporting new decorations these days. Both offices were recipients of the Belleville Historical Society's trillium award for landscaping. The prize, a large trillium of cast aluminum — was produced by a local manufacturer.

Ill-health has forced the retirement of St. Catharines PUC commissioner R. Douglas Hunter. Seventy-three-year-old Mr. Hunter was a commissioner for 24 years and before that manager of the utility. He served as commission chairman for six terms.

Bowmanville PUC's former manager George Van Bridger has been presented with a gold watch to mark his service to the utility. On hand to make the presentation was former Ontario Hydro Chairman W. Ross Strike, a past chairman of Bowmanville PUC.

W. Glenn Fisher, Windsor Utilities Commission manager since 1966, has died at 51 years of age. A Second World War veteran with the Royal Canadian Air Force, Mr. Fisher joined the utility in 1949 as an engineer.

William S. Mullin, 52, has been appointed Windsor Utilities Commission's general manager to succeed Mr. Fisher. Mr. Mullin has been assistant general manager since March, 1970. He joined the utility's electrical engineering department in 1958.

North Bay Hydro has named W. C. (Wib) Elliott as secretary-treasurer to succeed Oscar W. Harris, who is retiring. Mr. Elliott joined the utility in 1958. Before his appointment he was supervisor of general accounting and personnel. He will retain his duties as personnel officer.

Aylmer Mayor Forrest Moore presented long-service emblems to Stewart McBrien, PUC manager, and Miss Irene Bancroft, secretary-treasurer, with gold watches to mark their retirement. Mr. McBrien served 31 years with the commission and Miss Bancroft 30 years.

The final link in Meaford PUC's third substation has been installed and is working. A 10-ton transformer has been positioned and the substation brought into service to feed the south end of town. A smaller transformer has been delivered to serve the town's new all-electric senior citizens' home.

Renfrew Hydro's secretary-treasurer, Lillian Walker, has been featured in a "Women in Business" column in the local newspaper. A Mercury-Advance writer has written a column outlining Mrs. Walker's quarter-century career with the utility.



as don wright sees it

'Twas the night before Christmas when, all through the house, not a creature was stirring – not even your humble and obedient servant. He was, of course, played out from an arduous day at the office and his stentorian early-evening snores had nothing to do with the unaccustomed generosity of the rounds served earlier at the local watering hole in deference to the season.

Bored by the monotonous train of pink elephants marching in living color before our mental TV set, we were pleased at last to see the beast bringing up the caboose. But, lo – why was he carrying that big mysterious bag with our name on the tag?

Some exotic offering from the Maharajah of Mississauga we surmised gleefully as we tore at the ribbons to get at the contents. And what to our wondering eyes should appear but a great hoard of hard, beetle-like brown candies striped in white. Bah! Humbug! we cried, both heatedly and accurately, and the sound had hardly died away before the glowing figure of a lovely lady stood beside us. She was dressed all in white, carried some kind of crazy little stick and seemed to be wearing wings.

"Who can speak of humbugs at a time of the year when the air is full of dancing snowflakes and the joyous sound of children's laughter is borne on the frosty air?" asked the lovely lady.

Who needs a heavy even if she is a bird of some beauty all dressed in white? we asked ourselves, still vexed with the maharaja. "Speak not of dancing snowflakes," we rejoined. "These have a way of losing their joi de vivre upon contact with the ground whereupon they lie supine in such numbers as to impede the progress of law-abiding citizens intent upon their lawful rounds. As for the sound of childish laughter, it is no doubt based upon the greedy expectation of great riches in the form of toys and games and good things to eat."

"But this is no big thing," spoke the lady of the night. "Why else are you feeding on pills when you should be anointing yourself with the Christmas spirit?"

"Prithee, fine lady," we replied, lapsing into olde English as we are prone to do when passing the time of day with winged strangers of the opposite sex, "are ye so far removed from this earthy realm that ye know not the true state of affairs?" And with that we went on to explain the philosophy behind the bah and the humbug.

"How can cats lose their cool over a mythical fatman whose bag it is to con dumb little kids into believing he can circumnavigate the globe in 24 hours with the aid of eight aging and undersized reindeer?", we asked rhetorically.

"Visions of sugar plums are all very well but the poor and the unemployed will no doubt prefer bread and peanut butter. With all due apologies, ma'am, how can we dwell on angels and the Heavenly Host when René Levesque still stalks the sidewalks of reality?"

"Doomsday has been soothsayed too many times by ecologists of great wisdom for us to get carried away by sleigh bells or the smell of chestnuts roasting over an open fire. Open fires mean carbon dioxide and oxides of nitrogen while sleighs are drawn by horses. Everybody knows what a well-fed horse can do to the environment."

"Alas and alack," the fair lady observed with perspicacity, "things are indeed in bad shape but think of the good things to come – like fat turkeys and cranberry sauce and other goodies of a similar nature."

"Who knows how much mercury is contained in the modern turkey," we reflected aloud as we sucked another humbug. "And cranberries are for the birds (who will probably die from herbicide residues lurking in the depth of these little red berries)."

"Look about you," she cried with a sweep of her wand, "do not the twinkling lights of Christmas spell out peace on earth, goodwill towards man?"

We had her on the ropes now and weren't about to let up.

"They do – or they did in years gone by, but that was before the wise men put us straight. Lights depend on electricity and there's a good chance some of it was produced by burning coal or oil or gas – all potential sources of pollution."

"But don't let's stop here. Dwell for a moment on some of the other ways Christmas imperils the balance of nature which is so delicate that the heedless destruction of a single amoeba is tanta-

mount to throwing a monkey wrench into the entrails of a fine watch.

"Aside, dear lady, from reindeer droppings and the increased incidence of infectious mononucleosis brought on by the traditional shennanigans associated with mistletoe, there is the question of disposal. The whole Christian world is inundated each year with gift wrappings, turkey bones, Christmas trees, empty bottles and worn out wallets. Countless innocent amoebae are doubtless done to death 'neath the debris."

"Lack-a-day," lamented our lady somewhat old-fashionedly, "but surely the sounds of Christmas are a joy unto themselves. Hark to the sound of the herald angels. Hear the gentle rustle of their wings. Does this not warm the cockles of your venerable left ventricle?"

"That, oh ethereal one, is no herald angel. You are tuned in to the soft swishing of bat wings in our belfry and this has been brought on by a chronic case of environmental indigestion with ecological complications."

At this, the lady lost her cool and administered unto us a great and solid prod in the solar plexus with her crazy stick before vanishing into the starry night.

Only her wand remained – transformed into a broom handle and held in the hands of our good and gentle spouse.

"Outside, you oaf," she whispered seductively, "and sweep up some of those snowflakes lying supine upon the ground in such quantities as to impede the progress of law-abiding citizens intent upon their lawful rounds."

And so it came to pass that the air was indeed frosty and there was the sound of sleigh bells and merry was being made throughout the neighborhood. All about the snow lay deep and crisp and even. Nowhere was there any sign of sulphur dioxide or 2, 4-D. Even the next-door neighbor wore a smile and he's an ecologist.

"Ho, ho, ho," quoth he, making his way over to our house on the crest of the new fallen snow. But why was he carrying that big mysterious bag with our name on the tag?

"Just a little gift for you folk," he chuckled and his belly shook when he laughed like a bowl full of jelly – "Merry Christmas."

Our fingers trembled as we fumbled with the ribbons. But, lo – it was filled to the brim with jelly beans and chocolate turtles and sugared gumdrops and other tasty items of a similar nature.

"Merry Christmas," we cried, "and to all a good night."



The Stephen Leacock house in Orillia

nineteen hundred and seventy-two

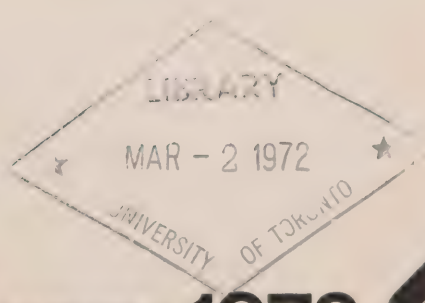
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a century of weather



ontario hydro news · january 1972





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the cover

Now known as the Atmospheric Environment Service, meteorology in Canada recently celebrated its first 100 years. Feature on the service and Ontario Hydro's association with it starts on page 11.

editorial board

George E. Gathercole, Chairman, Ontario Hydro
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Andrew Frame, President, OMEA
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Looking ahead

The year ahead will bring with it events and developments of major significance to those of us who are engaged in the production and distribution of electricity in the province.

Overshadowing the Canadian economic scene are those international events which have caught us all up in their vortex. The effect on our economy of the measures adopted by the United States to deal with the crisis in its balance of payments with other nations is not yet fully manifest. However, with so much at stake we can be confident that solutions will be found.

The degree of international accord which has recently been achieved in currency realignment, monetary procedures and trade is reassuring.

On the other hand, the threat of inflation is still very real and this is a long-term problem of the greatest concern to us because we are engaged in a continuing construction program of enormous proportions.

Our partners who distribute power at the municipal level share our concern as the wholesale cost of power is a predominant factor in their cost of doing business. Unfortunately, the electrical supply industry is not immune to inflationary forces. For many years rates were held relatively stable, but this is no longer possible as higher wages, plant expenditures and interest rates drive up costs.

Our decision to defer rate increases which would have taken effect on January 1 was a temporary measure brought about by the serious economic situation. Rate increases are inevitable in the not too distant future.

On the brighter side, interest rates have receded from their peaks, but they are still historically high - higher than on other occasions when the economy has emerged from a recession.

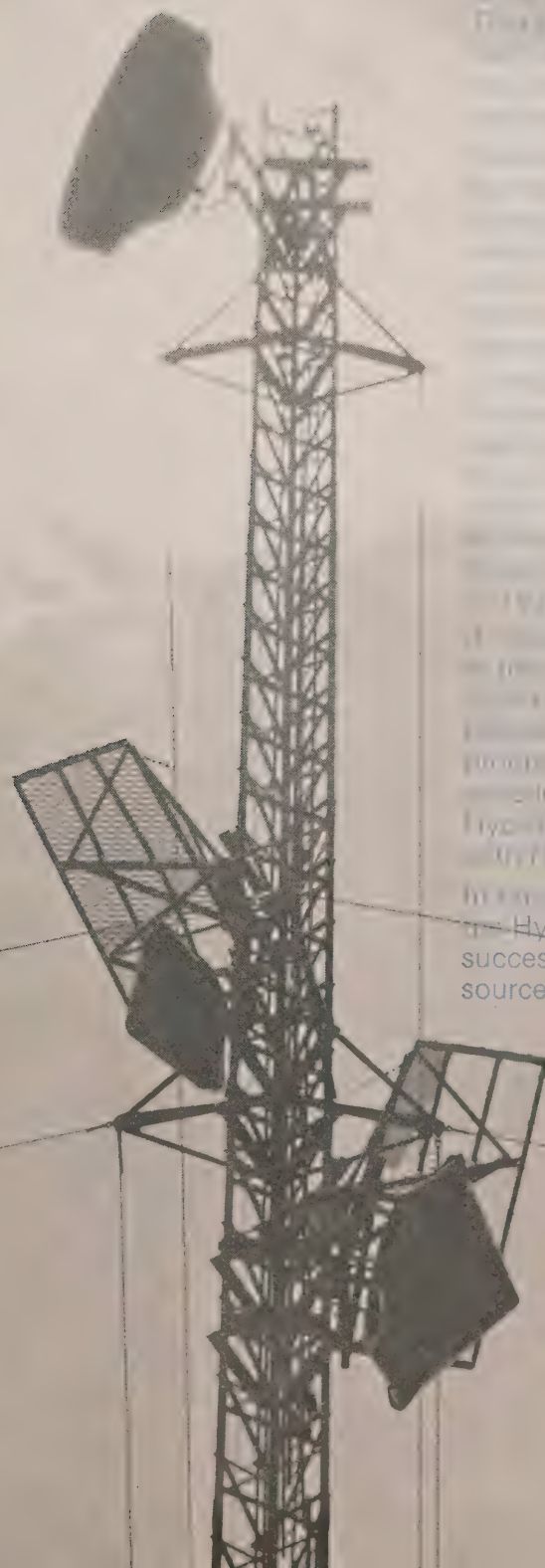
Two studies are being undertaken which could have a considerable influence on Hydro. One is being conducted by Task Force Hydro under J. Dean Muncaster and Richard M. Dillon and the other, under Dr. John Deutsch and Stuart Clarkson, will deal with long-range energy policy in the province. Together, these studies will undoubtedly produce guidelines and recommendations of importance to ourselves and our customers. It is probable that any decisions on how electrical distribution should be handled under regional government will be made in context with the wider studies now being conducted.

Selective marketing remains an important part of our operations, but it does give rise to a lot of public misunderstanding. Our advertising program is designed partly to inform people of a service and form of energy which is most compatible with the type of environment that most people desire, and partly to improve the efficiency of our operations so that we can continue providing a high standard of service at reasonable rates despite inflationary increases in costs.

Ontario Hydro's advertising program is not a major reason for increases in electricity demand today. Rather, these increases result from growing population, increasing industrialization and urbanization, the growing popularity of electricity due to its advantages over other energy forms for many applications, and other related factors including its use by many industries to help clean up their pollution problems. Growth for growth's sake has no part in our philosophy.

As to the environment, I see many signs that many of these problems are being overcome. The success of the first two units at Pickering should open the way for greater development of clean nuclear generation. Aside from this, we have made progress on several fronts in our anti-pollution efforts and I am confident that the next few years will bring successes which will establish electricity as the key to a clean and prosperous future. Certainly, none of our difficulties is insurmountable. There is not the slightest doubt that greater success lies ahead for Ontario Hydro and greater well-being for our province.

GEORGE GATHERCOLE, Chairman, Ontario Hydro



successfully dealing with change will be
source of strength in 1977.

Hydro enterprise. Its long record of successfully dealing with change will be a source of strength in 1975.

on the nuclear scene

History will record 1971 as a year of accomplishment for nuclear power in Ontario. Two of the four 540,000-kilowatt units at Pickering nuclear power station achieved full output within a span of six months.

By year end, they had generated about three billion kilowatt-hours making an encouraging start on the lengthy shake-down period required for prototype units. Their output helps to ensure Hydro will have adequate generating reserves to meet this winter's energy demand.

The availability of the two Pickering units marked a five-fold increase in the amount of power produced from natural uranium in the province. But the achievement is significant for three other reasons that may not be readily apparent:

- For the first time, a large amount of nuclear-electric power is being sold at commercial rates to offset the large capital investment.
- It has already resulted in the conservation of a million tons of imported coal, which costs an average of \$11 a ton.
- Because Pickering's fuel costs are lower, generation from higher-cost coal-fired units has been cut back and air pollution reduced.

Another step forward was taken in November with the first on-power fuelling operation using Pickering's twin computer-controlled fuelling machines.

Although the successful operation of the Canadian system is not dependent on on-power fuelling, it permits flexibility in scheduling maintenance work and savings in fuel costs.

Steady progress was also made in commissioning Unit 3, which should be ready in mid-1972 when, it's hoped, adequate supplies of heavy water will be available for startup. Unit 4 is expected to be ready for service in 1973.

Construction work is now well under way on the 3,200,000-kilowatt Bruce generating station, which is scheduled to produce first power in 1975.

The heavy water situation brightened

somewhat during the year, but in the short run supplies will remain tight.

Commissioning tests have begun for the various systems at the 800-ton-a-year Bruce heavy water plant at Douglas Point. The plant is due to start up in mid-1972.

Toward the end of the year, operation of the 400-ton-a-year Canadian General Electric plant at Port Hawkesbury, N.S., had been stepped up close to full output and the federal government loaned \$95 million

for the rehabilitation of the inoperative Deuterium of Canada Ltd. plant at G. Bay, N.S.

Elsewhere, Canadian-type reactors are installed at Gentilly, Que., and at Karachi, Pakistan, and startup of the first of two 200,000-kilowatt units at Rajasthan in India is expected early this year.

AECL officials are optimistic that Pickering's early success will improve prospects for Canadian reactor sales abroad.



Soviet Premier Alexei Kosygin views the spent fuel bay during his tour of Pickering nuclear powerstation in October. Below, coal is stockpiled at Lambton generating station, near Sarnia.

coal and oil

The initial unit in a 6.2 million-kilowatt expansion of fossil-fuelled generating capacity produced first steam last month at Anticoke generating station on Lake Erie. The 500,000-kilowatt, coal-fired unit is the first of eight which will come on the line by 1977. The second unit is due for service later this year.

Meanwhile, foundation work is well under way at the 2,295,000-kilowatt Lennox station, near Kingston, which will burn oil.

Four units will come into service progressively between 1975 and 1977.

Both stations will be equipped with highly efficient electrostatic precipitators and high stacks to preserve air quality.

This conventional thermal phase of the current expansion program alone will provide more than twice as much power as Hydro's total capacity in 1950, which was then virtually all hydro-electric. It will

double fossil-fuelled generating capability, which last year represented 47 per cent of the total from all sources.

Looking to the future, a potential site for a thermal station has been acquired at Wesleyville, near Port Hope, and options are being taken up on 700 acres in Darlington Township, near Bowmanville. No decision has yet been made on whether these stations will use fossil fuels or uranium.



water power

While thermal-electric expansion picked up steam in 1971, the last hydro-electric station in the current construction program was completed.

Lower Notch generating station, located near the mouth of the Montreal River near Cobalt, is producing 228,000 kilowatts for the system.

But on October 7, Hydro Chairman George Gathercole announced that an 87,000-kilowatt hydro-electric plant may be built on the Madawaska River, near Arnprior.

Final go-ahead on the plant, expected to cost about \$51 million, depends on approval by the province, acceptance by the community, soil tests and effects of a new station on upstream plants.

At the moment, Hydro has four hydro-electric stations on the Madawaska with a capacity of 448,900 kilowatts.

Although the Aubrey Falls and Wells generating stations on the Mississagi River came into service in 1969 and 1970, the official dedication ceremony was delayed until last July. The stations have a combined output of 333,500 kilowatts.

Meanwhile, a 560-mile transmission loop linking Thunder Bay and the Manitoba boundary is nearing completion. The southern part of the loop will begin to carry low-cost power from Manitoba Hydro's Nelson river project this year, providing additional security of service for northwestern Ontario. The northern part is scheduled for service in 1974.

The Thunder Bay-Manitoba link is an extension of a high-voltage transmission line joining Hydro's east and west power networks which came into service in 1970.

Low-water levels prevailed during the dry summer on the Ottawa River where the July level was the lowest recorded since 1916. As a result, hydro-electric output declined abruptly. But the deficiency was made up by other sources.

Some improvement occurred on the Ottawa last fall, although winter flows are expected to be below average. Elsewhere in the province, water levels range from normal to above normal.



Water roars down the spillway at Lower Notch generating station. Now being diverted through the plant's turbines, this pent-up energy of the Montreal River is producing 228,000 kilowatts of electricity. Below, bucket trucks supersede climbing irons as the municipal utilities take every advantage of technology to increase efficiency and cut costs.

the utilities

Regional government and rates policy trends will be closely scrutinized in 1972 by the 353 municipal utilities which distribute 10 per cent of the energy sold by Ontario Hydro.

The provincial government is in the process of forming a general policy on the relationship between Hydro commissions and regional government. It announced last year that formation of such a policy would precede any major re-organization of utilities.

Task Force Hydro recommendations will likely have a bearing on that policy, too, and on Hydro's rates philosophy. Task force studies are now well under way and recommendations can be expected this year (see also Page 10).

Andrew Frame, of Burlington, president of the Ontario Municipal Electric Association, and D. J. Gordon, Ontario Hydro's general manager, are members of the task force steering committee.

Although all municipal utilities will follow developments with keen interest, regional government policy will particularly affect utilities in Niagara, Ottawa-Carleton, Muskoka and York County where regional governments have been established. Other regional governments are contemplated in Sudbury, Kitchener-Waterloo, Halton-Norfolk, Hamilton-Wentworth, Haldimand-Norfolk, and Oshawa areas.

A pattern for utilities may be set in the regional municipality of Niagara where the MEA has recommended retention of seven elected commissions and the absorption of four utilities into Ontario Hydro's regional system.

In a brief to the provincial government, the MEA said the guiding principles in its recommendations were that municipally-owned electric utilities should be managed by elected commissions and that utility service areas should coincide with municipal boundaries.

Power costing together with rates philosophy and external financing are two key areas selected for special studies by the task force. These have significant implications because the wholesale cost of power charged by Ontario Hydro is the major expense faced by utilities and forms the

basis for retail sales. Financing Hydro's expansion also affects power costs.

Mr. Gathercole announced in November that, despite rising costs, proposed rate increases in wholesale power rates would be postponed because of economic uncertainties. But he indicated rates will be kept under review in 1972.

During 1971, co-operative marketing, purchasing and computer-sharing plans were extended by the municipal utilities.

The Co-operative Marketing Plan for Electric Commissions (Compec), which originated in Essex County, grew with the setting up of organizations in Huron, Perth and Middlesex counties. Five Compecs, including Essex and Lambton, are now operating in Hydro's Western Region, embracing 33 municipal utilities. Others are functioning in Norfolk County and in the Bowmanville area.

A growing number of municipal utilities are sharing computers. London PUC expanded its billing service to 22 utilities

last year and Oshawa PUC expected to be serving about 9 or 10 by year-end.

And during the year, many utility representatives attended seminars, meetings or conferences on safety, supervision, data processing, accounting, management and other topics in addition to their district meetings and annual convention.

Many utilities have active underground wiring programs in downtown or suburban areas. Oakville began a \$3 million program to convert the downtown area distribution system to underground over a 10-year period. Barrie PUC set 1995 as a target date to place its entire distribution system underground.

A number of utilities made or planned improvements in their buildings last year. Etobicoke Hydro officially opened its \$613,000 Judson service centre and London PUC moved into the new city hall. Utilities planning new or renovated facilities include Toronto, Brantford, Paris, Renfrew, and Owen Sound.



the environment

Toronto will have cleaner air in 1972 as a result of Ontario Hydro's aggressive air quality program.

The new 700-foot stack at the R. L. Hearn generating station on the Toronto waterfront was placed in operation last fall and the plant converted to burn natural gas as well as coal.

The result of the switch will be a 70 per cent reduction in sulphur dioxide emissions from the station. In addition, the high-rise stack disperses hot gases into the upper air to minimize ground-level concentrations.

The eight existing small stacks at the station are being demolished.

During the year, Hydro pressed forward with research into the removal of sulphur dioxide from flue gases.

A small pilot plant which removes sulphur dioxide by interaction with a limestone slurry has operated for more than a year at Lakeview generating station, including a 1,000-hour continuous run. Results indicate an efficiency of between 70 and 80 per cent.

Pilot plant operations will continue this year to provide design data for a larger demonstration plant under consideration. Engineers will also test and assess improvements to the limestone scrubber in an effort to increase its efficiency.

Meanwhile, laboratory work is under way to study methods of removing or reducing nitrogen oxides which are formed when coal, oil, or natural gas is burned.

Other environmental research is related to the possible effects of warm water discharged by power plants. Lake studies are being conducted at the sites of all thermal-electric stations planned, under construction or operating.

Ontario Hydro has also asked soil scientists at the University of Guelph for suggestions on research that might be carried out on using warm water from thermal power plants to improve crops and extend the growing season of vegetables and other produce.



Diver helps Hydro scientists install a current and temperature recorder in Lake Ontario off Pickering nuclear power station. Below, combinations of different varieties of grass and shrubs are being tested to find the most suitable species for rights-of-way.

easier on the eye

Ontario Hydro will have more eye-appeal in 1972. A wide-ranging program will improve the appearance of stations and rights-of-way and make better use of land.

These efforts include tree-planting to green structures, landscaping around stations, and test installations of more compact and attractive towers.

The possibility is being explored, too, of extending use of power line routes to include public parklands in both urban and rural areas.

Plans have also been announced to develop a public park and conservation area adjacent to Pickering nuclear power station. This is expected to be ready for use next

summer. And a 75-acre tree farm has been established at Pickering to study 39 different tree species for planting under power lines.

In addition, Hydro is working closely with provincial authorities in developing service corridors for major highways and other utilities. The intention is to reduce land requirements for essential services such as electric power.

Extra High Voltage lines are used wherever possible to move large blocks of power and save land. A 500,000-volt line, for example, has four times the power-carrying capacity of a 230,000-volt transmission line.

Research is continuing on placing high-voltage lines underground, but the costs and technological problems of moving large amounts of power over long distances are still formidable.

Since 1932, more than 2,000,000 trees have been planted by Hydro as part of its continuing reforestation program. Currently, over 100,000 tree seedlings are planted each year.

Hydro foresters are also testing suitable combinations of grasses and shrubs for ground cover which will grow quickly in cleared areas. These will retard unwanted weed and brush growth, give cover to wildlife and reduce the need for spraying rights-of-way.



the economy



Uncertainties wrought by the current world trade situation are expected to cloud the economic outlook in 1972.

The U.S. surcharge on a wide range of Canadian goods was lifted in December, but various forecasters agree that the Canadian economic recovery that began in 1971 will be moderated this year to some degree by U.S. action to improve the American balance of payments position.

Power demands in Ontario are a fairly sensitive barometer of economic activity in Ontario. If an industrial slowdown occurs, it will undoubtedly be reflected in a decline in the rate of increase in power demands.

The long-term increase in power demands of close to 7 per cent a year has been remarkably consistent despite economic

ups and downs. Last year, however, unseasonably mild weather in December coupled with the economic slowdown resulted in a rise in peak demands of only 2½ per cent over December, 1970.

Long-term interest rates are expected to drop slightly in 1972 as a result of declines in short-term rates. But current rates are still much higher than they were a few years ago and Hydro is paying off bonds bought at historically high interest rates. These have become built-in costs which are the legacy of inflation.

In the meantime, Hydro is committed to a large-scale expansion program which will require large amounts of capital. The current program will expand generating capacity by 10.6 million kilowatts by 1978 at a cost of \$2.7 billion. Capital spending in

1972 is estimated at \$620 million, compared with \$550 million last year.

To the extent that Hydro needs U.S. funds to finance this program, the uncertain U.S.-Canada trade situation presents difficulties in floating bond issues across the border.

And, as noted on page five, wholesale power rates have been pegged for the being at the 1971 level despite rising costs and previous indications that an increase would be necessary.

In short, the storm clouds hovering over the Canadian economy in 1972 may produce anything from scattered showers to a steady downpour. In the presence of uncertainty, however, it's difficult to foresee a silver lining in 1972 if unemployment continues at the present rate.

Share prices on the Toronto Stock Exchange reflected public sentiment on Nixonian economics last year. Peak power demands rose only 2½ per cent due to a mild December coupled with the slower economy. Below, an estimated 10,000 all-electric homes are expected to be built in 1972.

heating and cooling trends

Electric heating and air conditioning are expected to grow in popularity in 1972.

Last year, about 6,000 central air conditioning systems were installed in Ontario and 36,000 inquiries were received. This year an estimated 7,000 units will be installed, indicating that central systems will increasingly displace window-type units.

Electric heating was installed in an estimated 8,600 homes in 1971, compared with 7,855 the previous year. In addition, an estimated 2,200 homes were converted to electric heating last year.

During 1972, an estimated 10,000 new all-electric homes are expected, and another 3,000 conversion projects.

By the end of 1971, electric heating had been installed in more than 80,000 homes in addition to motels, schools, apartment and office buildings. In Toronto alone, 54 per cent of new apartment suites are electrically-heated.

Keeping up with technological changes, Ontario Hydro is co-operating with system builders who manufacture concrete slabs and framework in a factory for assembly on site. Electric heating cable fastened to a steel wire mesh and embedded in concrete floor slabs is being tested in six apartment suites in Metro Toronto and in two system-built housing units at the University of Guelph.

Meanwhile, interest is growing in electrical applications for controlled environment and mechanization in farm buildings, for microwave process heating in the food and beverage industry and for induction heating in the metals industry. One of the advantages of electric induction furnaces is the reduction of air pollution in companies switching from other forms of energy.

During the 1970's, a growing amount of electric power is expected to be used for other environmental purposes, including tertiary sewage treatment to remove phosphates and in rapid transit, urban renewal and the recycling of waste materials.



task force hydro



The spotlight will be on Task Force Hydro in 1972.

Wide-ranging studies conducted by the task force will spawn a series of recommendations this year about Hydro's future objectives and policies.

Task force findings will have significant implications for Ontario Hydro and the 353 associated municipal electric utilities. Hydro Chairman George Gathercole has welcomed the opportunity for a "detached and objective view" of the organization.

J. Dean Muncaster, president of Canadian Tire Corporation, is heading the task force steering committee. Richard M. Dillon, dean of engineering at the University of Western Ontario, is executive director.

The task force is studying the functions, structure, operation, financing and objectives of Ontario Hydro with the aim of assuring the quality and quantity of its service to the public in the future. As well, it is looking at Ontario Hydro's interrelationships with the government, other bodies and the public.

The task force has been interviewing Ontario Hydro employees at all levels and has received submissions from private citizens and special interest groups.

Underlining the important role played by the municipal utilities, Andrew Frame, president of the Ontario Municipal Electric Association, is a member of the task force steering committee together with D. J. Gordon, Hydro's general manager. The managers of the OMEA and the Association of Municipal Electrical Utilities, who are task force liaison officers, have also presented their views.

The OMEA is preparing a formal submission to the task force and a number of municipal utilities have submitted their own briefs. In addition, task force members have interviewed utility managers and commissioners in all parts of the province.

The task force has indicated that information contained in submissions will have a vital impact on the various studies undertaken.

Two major studies deal with Hydro's "role and place" in Ontario and its organization.

Special studies involve power costing, rates philosophy and external financing.

Indicating the depth of the studies, the task force will seek answers to a number of important questions in connection with Hydro's "role": Will the future see Hydro involved in other energy forms in some way? What could the future of Hydro be 10, 20 or 30 years? Is Hydro's role not only to produce and transmit power but also to distribute it to the retail customer? Will Hydro's regulatory function change in the future? What is Hydro's social role? What will be its physical growth by the year 2000? What are the implications of this growth?

In connection with the "place" aspect, such questions will be researched as: Where does Hydro fit into the governing structure of the country? What is the precise relationship with government? What body has the responsibility to make major policy decisions? What is the legal position of Ontario Hydro? What is the relationship of Hydro with such bodies as customers, utilities, AECL, and suppliers? Who owns Hydro?

The Ontario Advisory Committee on Energy, headed by Queen's University principal Dr. John Deutsch, is drawing up a long-range energy policy for the Ontario government and will be providing information for use of the task force.

The task force has set a time limit of one year on its studies. Interim recommendations will be issued while the studies continue and can be expected during the first six months of 1972.

Recommended courses of action will be presented to the Ontario cabinet for consideration. When recommendation is approved, the task force plans to assist in translating them into actual practice.

The government explained its intention in setting up the review of Hydro in a Speech from the Throne on March 30, 1971: "The government is determined to assure the adequacy of our energy supply for the future. It will ensure that the energy is used as efficiently as possible, and that its use will not adversely affect the environment, health or life." □



*one hundred years
of
weather*



by Sheila Kenyon

The allied forces which landed in Normandy in 1944 learned later that German meteorologists had assured their high command that invasion would not be possible on June 6 due to stormy weather.

To what extent did superior forecasting enable the Allies to take the Nazis by surprise and assist the most famous invasion in history? How many lives were saved?

No one knows for sure. But most of us who glance at a weather beacon, or have watched Percy Saltzman tossing his chalk around on television, underestimate the importance of modern weather prediction.

Planes and ships are guided around storm centres, populated areas receive

hurricane warnings and the reaping of crops is scheduled to fit with fair weather. Forecasting has become important to the construction industry, long-haul trucking and off-shore oil drilling to say nothing of everyday social activities. Even state visits are planned around the advice of the weatherman.

Long before modern times, weather prediction was important. (How many old-time sailing ships might have been saved with better forecasting?) But it is only in recent years that the weather could be predicted with increasing dependability. At that, it requires a worldwide network of land stations, weather ships, aircraft and satellites together with thousands of trained

men and women to chart and anticipate the vagaries of the climate.

Weather forecasting is so important to Ontario Hydro that the Commission maintains its own staff of meteorologists — Don Gillies and assistants Dave Sparrow and Yam Wong. Hydro's team works out of a small office in the heart of Toronto. Yet aided by delicate recording instruments, teletype and telephone, they can watch weather patterns throughout North America and relay warnings to personnel.

"One of my jobs is to relay a forecast for the following day to the Richview system control centre in Etobicoke," says Mr. Sparrow. "There the load scheduler takes over. Based on weather forecasts, he can

determine how many kilowatts will be needed."

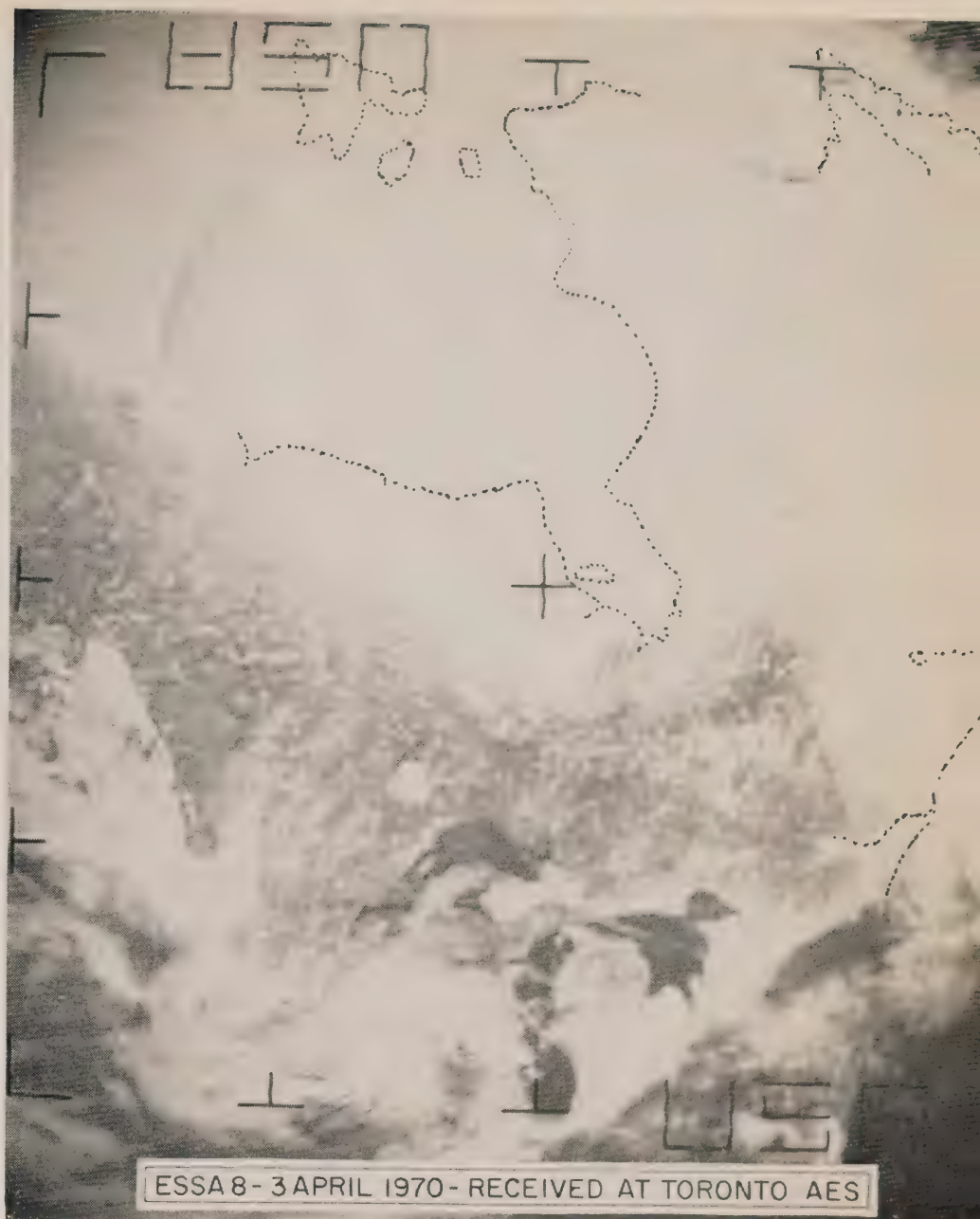
Utilities must estimate load requirements with care. One day last September, for instance, the temperature was expected to reach 80 degrees. The load scheduler was warned to expect increased demand for air-conditioning. He could then call for more steam from one of Hydro's thermal stations. Had the weather forecast been wrong and the power not needed, the extra steam would still have cost about \$1,800 an hour to produce.

Usually, though, Hydro can get rid of its surplus power. Electricity is bought and sold between interconnected systems in Canada and the U.S. much like a broker buys and sells stocks.

When Hydro appointed Mr. Gillies as its meteorologist in 1954, his initial job was to help predict the flow of water down the Niagara River.

In those days, power from the Niagara River generating stations represented a far larger percentage of Hydro's total capacity than it does now. The water flow is shared by an international agreement with the Power Authority of the State of New York. Because of the importance of the falls as a tourist attraction, the treaty states that 100,000 cubic feet of water a second must flow over them during daylight hours in summer. Additional water is diverted and shared for power purposes by the two utilities.

But it was difficult to predict how much water could be expected from day to day. Reverse winds on Lake Erie could reduce the flow of water in the Niagara River by as much as 60,000 cubic feet a second, cutting Ontario Hydro's share of the available power by 600,000 kilowatts — enough to supply the city of Hamilton.



On the other hand, westerly winds driving water into the river could increase the water flow to 300,000 cubic feet a second.

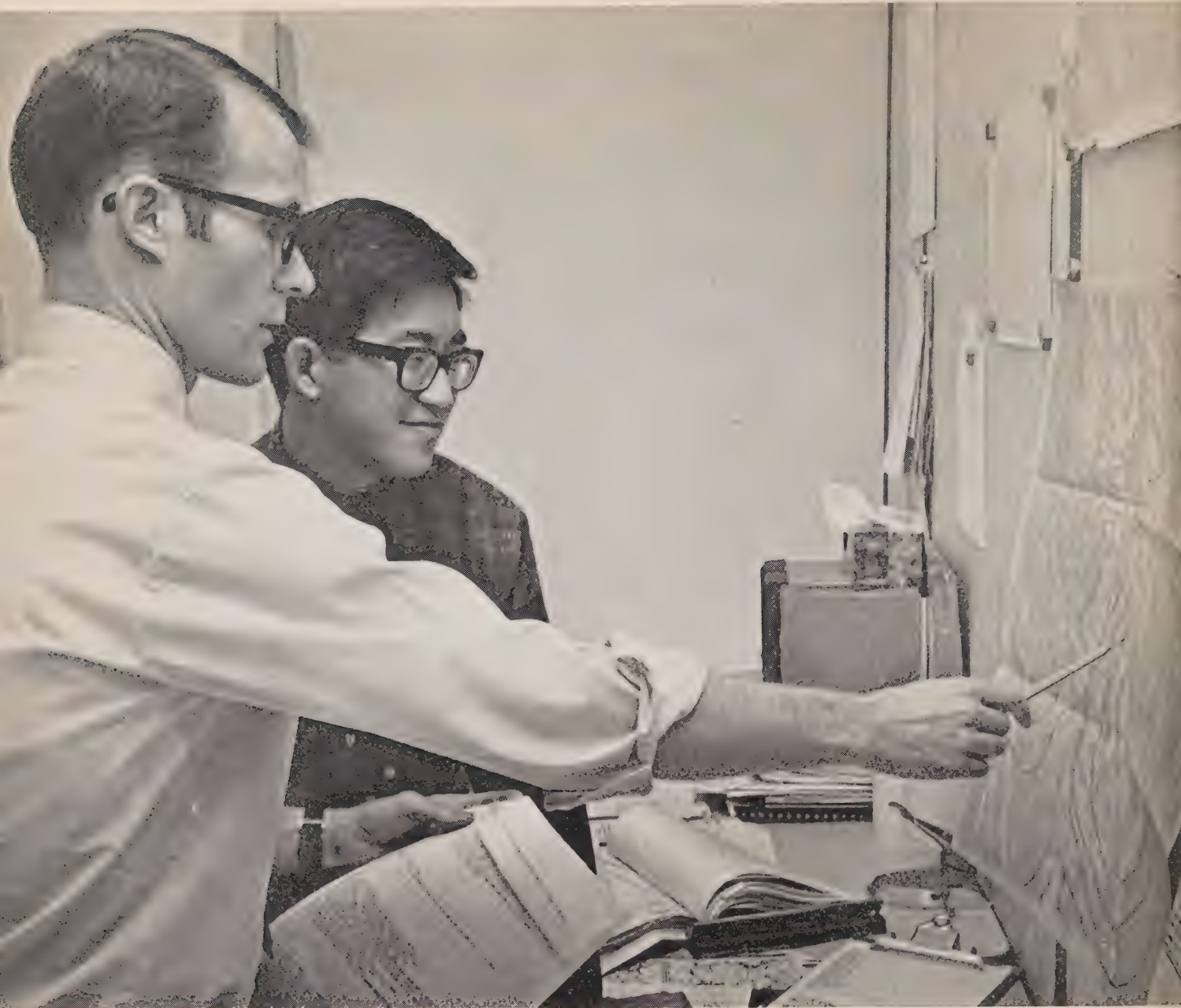
By predicting winds and water level changes at the entrance to the Niagara River, Hydro was able to get advance warning of the amount of water that could be diverted for use at the Niagara plants.

But studying changes in Lake Erie is only a small part of the Hydro meteorologist's day. Each morning, weather maps arrive by cab from the Malton weather station and are examined to determine how the warm or cold fronts may influence Ontario's weather in the next 24 hours. The meteorologist may have to send a weather forecast to various construction projects through-

out the province. He may be in touch with hydraulic study personnel or report lake weather to geotechnic survey teams on lakes Erie or Ontario.

Of course, the forecasts prepared in Toronto are based on observations throughout the world. Meteorologists report on weather patterns in the Atlantic, the Pacific, the Arctic and Antarctic. Tomorrow's weather may be strongly influenced by what happens in the Arctic today.

Canada shares data with the World Meteorological Organization in Geneva through the government meteorological service, now known as the Atmospheric Environment Service. The service, which has moved into a new headquarters in



Downsview, recently celebrated its 100th anniversary.

Meteorological investigations began in Canada back in 1839 when Lt. C. J. B. Riddell, of the British Army, set up the Toronto Magnetic Observatory as part of an international study to determine the true magnetic pole.

By the 1850's, weather observations were being carried out in Canada and daily weather maps containing data from a few Canadian stations and about a dozen U.S. stations were displayed in Washington.

In 1870, the United States established a national weather service.

Canadian government attempts to organize a meteorological survey began a year later

with a grant of \$5,000 to the University of Toronto. Professor G. T. Kingston, a professor of meteorology, became head of the new service.

At first, weather predictions were pretty rudimentary. A storm warning, for example, was usually to the effect that shortly after a time specified, or implied, a storm would probably occur in some portion of a certain region within a radius of 100 miles of the port warned.

Forecasts were issued at midnight for the morning newspapers and were also displayed in telegraph stations. Another innovation was the dissemination of weather forecasts by display discs on railway cars.

The idea was that farmers could watch for the discs as the trains passed by to know what the weather would do during the next 24 hours. The railway agent was informed at 1 a.m. and was responsible for displaying the right disc. However, the system was eventually dropped because agents failed to keep the discs up-to-date.

Another reason for Ontario Hydro's interest in the weather is the increasing emphasis on environmental control, especially air quality. This is Mr. Gillies' responsibility.

As chairman of Hydro's environmental control committee, he spends considerable time working with other government agencies concerned with pollution.

both he and Yam Wong work closely with Hydro's engineering department to assess the effects of different types of fuel on the environment and to assist in proper plant and stack design. The purpose is to ensure sulphur gases emanating from fossil-fuelled generating stations can be kept to a minimum concentration at ground level.

The emphasis in our thinking used to be assured by producing the energy load needed to serve the province. Now we have concentrate on meeting electrical production and, at the same time, ensure that station design meets the new standards for environmental protection today and for the future," says Mr. Gillies.

Meteorology today is far more than plain forecasting the weather.

With stepped-up oil and mineral exploration in the Canadian Arctic, the meteorologist has a vital role to play in teaching man to

live and work in this harsh and desolate environment. And in crowded urban centres, it's important to know when a temperature inversion may lead to a build-up of pollutants that, in turn, will force industry to cut back production under stringent environmental controls.

As Spaceship Earth becomes even more populous, the weatherman will be forced increasingly to bridge national boundaries and examine global patterns of pollution. But meteorologists are looking beyond mere predictions to control of the weather itself. Experiments in cloud-seeding to alter precipitation and efforts at fog dispersal, especially around airfields, are a start. Some day it may be possible to smother a hurricane before it becomes a killer; permit the rain to fall only at night.

Indeed, after 100 years of progress, it looks as though the meteorologist's job has only just begun. □



a two-way street

Hydro not only receives data, but collects and feeds it back to the Atmospheric Environment Service of the federal Department of the Environment.

Throughout the province, Hydro operates climatic stations to measure rainfall, temperature, and wind velocities. Some of the stations are Hydro-owned; others are owned by the government. But all are operated by Hydro personnel. Snow surveys are also made and the information given to the Atmospheric Environment Service.

To mark Hydro's contribution to meteorology, and to mark 100 years of meteorology in Canada, Hydro weatherman Don Gillies was presented with a wall plaque last month by the government department.

Mr. Gillies, right, is shown receiving the plaque from George Pincock, of the Atmospheric Environment Service. □

takedown tower put to the test



It went off with all the smoothness and precision of a military exercise. Five-ton transmission towers were flown in piece by piece by helicopter. Then a line crew swarmed around to assemble the section five in all.

The operation was part of a week-long trial near Barrie of a new V-shaped aluminum tower to be used as a replacement during emergencies on Hydro's 500,000-volt grid.

Three different lifting techniques were used to assemble the towers — by helicopter, crane and gin-pole.

"We wanted to see how easily we could erect them using all three processes, as well as train line crews to do the work," said Syd Money, of Ontario Hydro's line maintenance department.

Each tower consists of two legs, a main beam attached at the top of the V and two wing arms, which are hooked on the side of the beam. When complete, they range from 123 feet to 163 feet in height. The pieces can either be airlifted into remote locations or broken down in a different way for transportation by road in more accessible areas.

Right now, there are 15 towers stored in three locations: Barrie, Sudbury and Timmins, all of which are near the path of the 500-mile-long extra high voltage line which carries power from the James Bay watershed to southern Ontario.

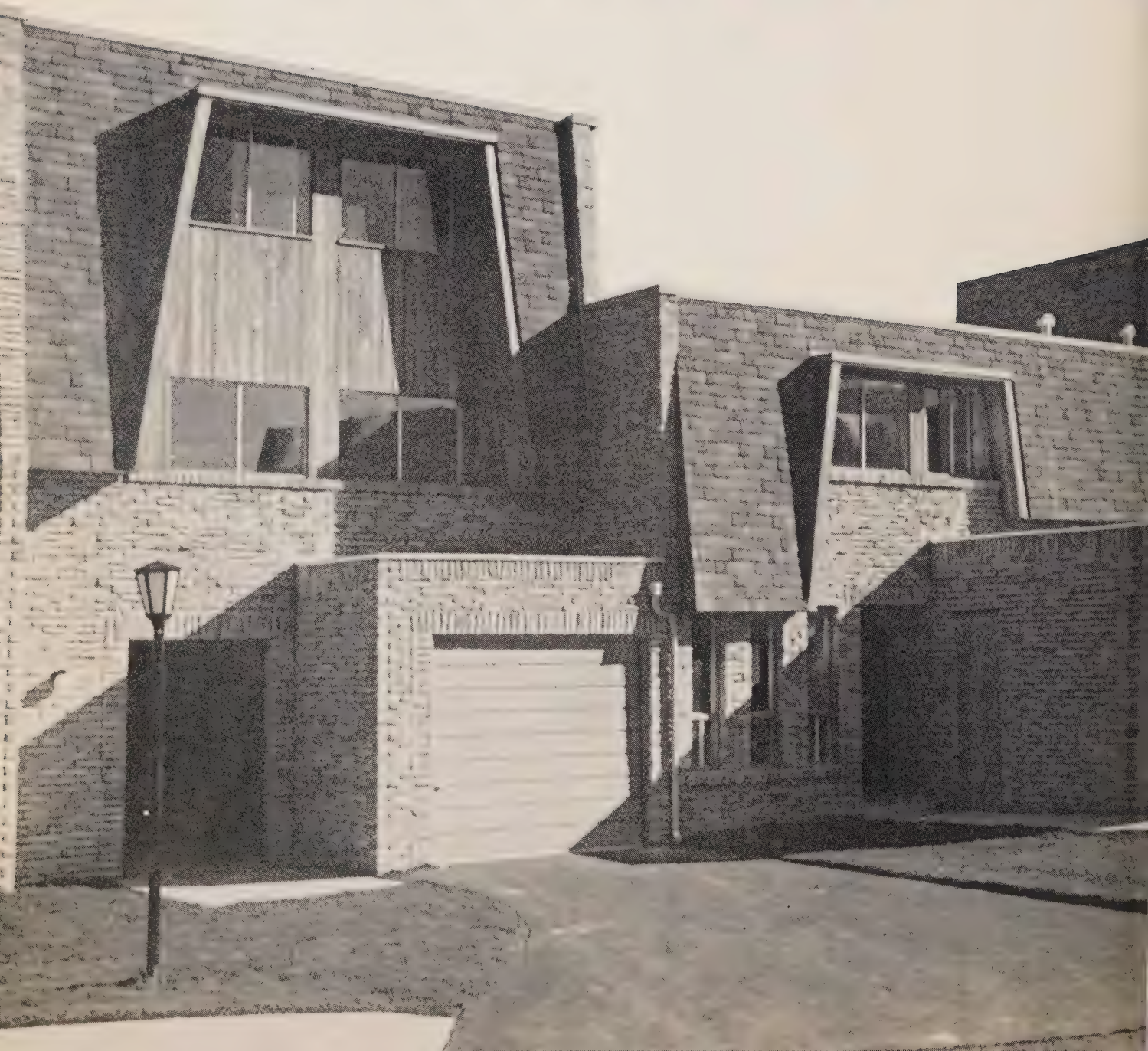
When will they be used? The men who maintain the power lines hope never. It's only as far back as 1970, a freak storm which wreaked death and destruction in the Sudbury area bowled over six EHV towers like ninepins.

It's comforting to know Hydro's takedown towers will not be far away. □

Main beam of the new five-ton extra high voltage transmission tower is flown in then unhooked and assembled with other sections already on the site.



THE year of THE



Real estate developers will probably remember 1971 as the year the condominium took over. In Metro Toronto alone, the paint is barely dry in more than 11,000 units of varying dimensions and design. And there are more to come.

Never before has there been such a buyer's market in housing and it's unlikely there will be again," says Arthur Vaile, sales manager for Flemingdon Woods, a development that will ultimately comprise 94 units.

Perhaps it was Expo 67 with architect

Moshe Safdie's imaginative Habitat that started it all. Anyway, it was in 1967 that the Ontario government passed the Condominium Act making it possible for families to own individual units in multiple-unit structures.

Then the federal and provincial governments actively promoted this new form of housing. Central Mortgage and Housing Corporation assigned \$4.3 million in 1967 to finance trial condominium projects across the country. By December, 1970, CMHC's handout had stepped up to \$33.2 million.

The Ontario Housing Corporation went even further. It included condominium housing in its Home Ownership Made Easy (Home) program and in 1969 went into the lending field to provide mortgage financing for condominium units. In 1970, OHC greatly expanded its lending activities and committed more than \$192 million in first and second mortgages for the construction of over 10,000 units in 18 projects.

The public didn't demand condominiums. But now that they're here, there's tremendous curiosity. The townhouse units, the next best thing to a detached house, are quickly snapped up. Next are apartments with several bedrooms. The market for one-bedroom apartments is slow right now.

Although the word condominium dates back to Roman times, it's still perplexingly new to many Canadian ears because in the land of plenty the family dream has been to own a house with a plot of land around it.

Owning a condominium means owning a unit in a multiple-unit structure such as an apartment or townhouse block and sharing common elements that may include halls, elevators, garages and swimming pools. People tend to be suspicious about sharing. Besides, most Canadians brought up in family backyards just aren't used to settling high in the sky on a permanent basis.

But rising land costs and interest rates have put detached houses beyond the reach of most urban dwellers, so they're forced to look elsewhere. "Condominium housing is the third alternative," says Richard Snell of the OHC, "the first two being detached home ownership and renting."

In addition, the low "5 per cent only" down payment required by all CMHC and OHC-sponsored condominiums has made such housing practically irresistible. At Flemingdon Woods, you can buy a spacious three-bedroom apartment for \$25,000 with a down payment of \$1,260. At York Valley, you pay about \$23,000 for their three-bedroom unit and the down payment is \$1,120. A list of 20 OHC-sponsored condominiums shows that townhouses range from \$20,000 to \$30,000 and apartments from \$16,000 to \$26,000.

Living in an eyrie has its benefits. Some apartments have dreamlike views. From some you're treated to sunsets that would rival those in Hollywood Westerns. Most high-rise homes have pools, saunas, gym rooms, party rooms, hobby rooms. Large projects border parks, schools, shopping, transportation.

There are extras, too. Flemingdon Woods, for example, will provide a nine-hole golf course and classes in handicrafts

condominium

by Nalini Stewart



Most buyers, so far, are young professionals rather than the lower-income families OHC wanted to help. At Flemingdon Woods, middle and upper income families are buying the units. Average family income is \$17,000 and 99 per cent of the wives work.

At Greenwin's York Valley project, the average age is 35 to 41 and income \$12,000 to \$15,000, says sales manager Steve Burnstein.

At Chapel Glen, which will have 1,453 units when completed, the trend is similar. John Lyons, sales manager, says their buyers are between 31 and 50. They're

professionals whose family income is more than the \$9,800 they must earn to get an OHC mortgage for a two-bedroom apartment there.

Take Bill and Muriel Perry. Muriel is a secretary in Ontario Hydro's sales division. She and Bill have bought a two-bedroom condominium at Chapel Glen. "We don't have children and we spend weekends cottaging and snowmobiling so a condominium is ideal for us," says Muriel.

High-rise condominiums have made a show of catering to children by providing space for daycare centres and pram rooms.

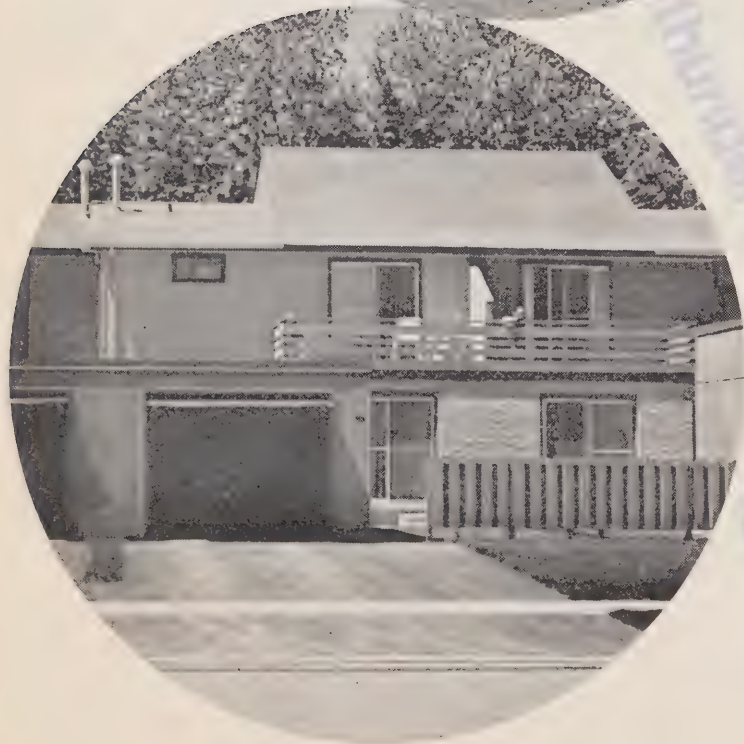
However, most families with young children

are opting for townhouses.

An exception is Kingsview Park, in Etobicoke, whose daycare centre, Mi Skool, has attracted 20 toddlers so far. The project, constructed by DelZotto Enterprises Ltd., will have 1,800 units when completed.

Condominium Research Associates conducted a national survey of condominium owners for the CMHC last year to find what the first owners across Canada liked and disliked about this form of housing. They found that location, kitchen layout, size of rooms and patios got a big plus. But owners disliked the lack of soundproofing, parking and recreational facilities.

Developers took heed and have tried to correct the complaints. You'll get the soundproofing in projects that use the new systems approach to building. Chapel Glen, for example, is constructed of heavy pre-cast concrete slabs that just happen to be natural insulators. Sales manager John Lyons delights in turning on a colour TV and stereo system at full blast in a m-





Windsor

Ottawa

Guelph



and beckoning prospective buyers to
neighboring suite where the only sound
they hear is their own breathing.

Electric heating is proving ideal for the
condominium concept and an estimated
100 units in the Metro Toronto area
will be electric.

The electric cable buried in the ceiling is
the most popular form of apartment heating,
and the trend in condominiums is to combina-
tion heating and cooling units. These
come in the form of air conditioner-type
units with built-in resistor elements
for heating. The unit is usually fitted into a
ceiling and the hot or cool air ducted to
the rooms.

With the systems approach to building
going on fast, Hydro is also experi-
menting with the idea of incorporating
fabricated heating elements into factory-
cast concrete floor slabs. Three test suites
were installed in phase 2 of the Chapel
Hill project, due for completion later
this year.

Monthly payments in a condominium are
relatively static. A three-bedroom apartment at
Hendon Woods, for example, may

cost \$182 monthly for principal and interest,
\$50 for property tax and \$45 for common
expenses which include snow-clearance,
landscaping, insurance, wages for mainte-
nance help and recreation. The total is
\$277 a month. At York Valley, the
comparable figure is \$252.

In high-rise condominiums, electricity is
included in the overall expenses because
there is a common meter and homeowners
are not billed separately. However, in
some projects they may be charged a small
sum for dishwashers and air conditioners.
Townhouse owners usually pay their
own bill.

Resale values of condominiums promise
to be high. The Toronto Star made a survey
of the 60 condominium resales that have
been registered in York County so far,
and found that in most cases the first owner
made a profit in the sale.

Condominium living has flourished in
Europe since the Middle Ages. In Belgium,
90 per cent of all housing is condominium.
In Australia, more than half the homes
today are condominium.

Condominium living is no panacea. But
it's one approach to housing that's within
most people's means and it's one solution
to preventing urban sprawl.



along hydro lines

Doctor retires

Barrie PUC employees last month paid tribute to Dr. J. E. Wilson, who has announced his retirement from the commission, by giving him an engraved silver mug and an honorary membership in their association. Dr. Wilson also received a silver tray and four matching goblets from the commission.

At the presentation, Mayor Les Cooke and E. R. Alexander, a commissioner for 12 years, praised Dr. Wilson for his 19 years of continuous service to the utility.

Dr. Wilson was also president of the OMEA in 1966. He and his wife are seen with Roger Tomlinson, left, president of Barrie PUC Employees' Association, and Mr. Alexander, second from left.

Dr. Wilson first entered public office in 1943 as a city alderman. He subsequently served as deputy reeve, and was mayor in 1950. He joined the PUC in 1953 to fill the unexpired term of C. D. Stewart, who had been named a Supreme Court justice. He's served ever since. □



Honorary employee

Airing those problems

Hundreds of delegates from municipal utility systems across the province will converge on Toronto's Royal York Hotel on Feb. 28, 29 and March 1 for the joint convention of the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities.

The problems of utilities both large and small will be aired in business sessions ranging over matters such as employee relations, power costing, cable television and pollution.

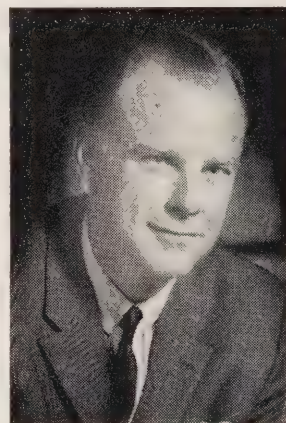
Royal York facelift

A major renovation of Toronto's Royal York Hotel, site of the OMEA-AMEU annual convention, has been announced by general manager A. Gordon Cardy. The facelift will affect the hotel's public rooms, restaurants, lounges and bars, guest rooms and convention facilities. About 75 per cent of the work will be completed by September.

Plans provide for new entrances sheltered by heated canopies, red carpeting on the sidewalk at the main entrance, and completely redesigned foyers and reception areas. A feature of the main foyer will be a graceful curving staircase leading to a boutique-type shopping area.

Kerr to address OEL

The future role of energy in Ontario will be discussed by Environment Minister George Kerr in an address to the National Electrical League.



George Kerr

Week dinner to be held in conjunction with the annual meeting of the Ontario Electrical League in Toronto on February 7.

The OEL meeting will feature seminars on new wiring techniques, electric heating thermostats, new requirements for Medallion electric awards. Major electrical manufacturers will have representatives on hand to discuss their equipment.

About 500 people, including electrical contractors, manufacturers and utility representatives, are expected to attend.

Cooling a hot number

The "Spring into summer" promotion of central air-conditioning by Ontario Hydro and a number of municipal utilities last summer produced sales of more than 5,000 units and a revenue of over \$1 million, says the Electrical Bureau of Canada.

The campaign used all key communications media including newspapers, magazines, radio and television, billboards and booklets. An important factor in the success of the program was Hydro's Electrical Modernization Plan for financing the unit.

Meter reading...at a distance

Latest techniques in metering including the remote reading of meters by telemetry were discussed by 230 utility persons attending a workshop in Toronto's Skyline Hotel.

The subject was introduced in a paper by H. Krutina, manager of Landis and Gyr, Inc. Another paper, presented by R. McManis, manager of business development for the Westinghouse electrical meter division in Raleigh, North Carolina, dealt with metering techniques throughout the world.

The research and testing of watt-hour meters was discussed.

Mr. R. Morgan, supervising technologist of instrumentation standards for Ontario Hydro, while delegates also heard from F. Mason, assistant district inspector for the Department of Consumer and Corporate Affairs. John Dawson, of Niagara-on-the-Lake, advocated moving all meters outdoors for convenience of reading. Mr. Dawson is seen with J. E. Moynes, of Lindsay, C. E. McGuire, of Ottawa, and A. D. MacPherson, of Toronto, all members of the workshop planning committee. □



planners

oltage talks

Distribution voltages were the subject of another recent AMEU workshop in Toronto attended by utility engineers from across Canada.

Delegates felt that a 25-KV distribution system had many advantages over existing 8-KV and 12-KV networks. It was pointed out that Ontario's present distribution system would represent only 15 per cent of the total distribution network in the year 2000. The increased levels were considered desirable in view of the expected growth in electrical demands.

At the same time, the meeting decided to urge Ontario Hydro to review its policy of upgrading sub-transmission systems from 66 to 44 KV, urging that the former level be retained.

Shown preparing for a panel discussion are A. S. Dobronyi, of London PUC; E. J. Murphy, Ottawa Hydro; W. J. Fisher, of Kingston PUC, and J. G. Sutherland, of Hamilton Hydro. □



the panel

ew rules for cars?

A drastic reduction in exhaust emissions from new cars has been proposed by the federal government

The proposed regulations will force manufacturers selling cars in Canada between 1973 and 1976 to cut back emissions of nitrogen oxides, carbon monoxide and hydrocarbons to 10 per cent of the 1971 level.

Nitrogen oxides and hydrocarbons react with sunlight to form smog. Carbon monoxide causes toxic effects at high concentrations by interfering with the transportation of oxygen in the blood supply.

Vehicle manufacturers and importers as well as petroleum companies will be invited to submit representations on the proposals.

An announcement on the proposals said motor vehicles have been responsible for approximately 90 per cent of all man-made carbon monoxide, 60 per cent of hydrocarbons and nearly 50 per cent of nitrogen oxides put into the urban atmosphere. The proposed reductions are in line with similar restrictions in the United States. □

A career ends

A career that spanned nearly half a century has come to a close for Oscar Waldon Harris, who retired as North Bay Hydro's secretary-treasurer last month.

Mr. Harris began his utility career 47 years ago as an office clerk with the old Peterborough Street Railway and Gas Company. Three years later, he moved to the former Oshawa Electric and Gas Company as a stores clerk and in 1930 transferred to Oshawa PUC (then Oshawa Hydro).

Mr. Harris moved to North Bay in August of the same year and became an assistant accountant with Ontario Hydro. A decade later, he assumed the position of accountant with North Bay Hydro. He was appointed secretary-treasurer and accountant in 1944 and secretary-treasurer after the amalgamation of West Ferris and Widdifield townships with North Bay in 1968.

Mr. Harris has been a member of the Masonic Order since 1929. Seen with him at a retirement dinner is North Bay Hydro manager Barney Graham, left. □



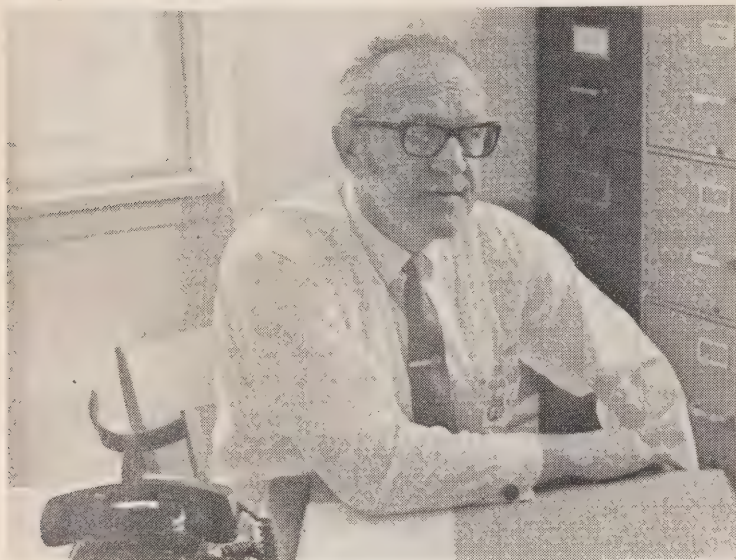
Looking back

OMEA vice-president

Palmerston PUC commissioner Arthur McQueen, a past president of the OMEA's District 6, has been elected first vice-president of the provincial association. Mr. McQueen succeeds Louis E. Davis, of Thunder Bay, recently appointed an Ontario Hydro commissioner.

A director of the OMEA since 1968, Mr. McGugan has served on the long-service committee, marketing committee and for the past three years has been a member of the power costing committee. He has participated in several panel and platform presentations at district meetings on behalf of the power costing committee. □

Top salesman



It was a very good year

Brantford PUC sales representative Hugh Kelley (above) is sporting a new attache case on his rounds these days — his prize for being named utility salesman of the year in the Niagara region.

Both Mr. Kelley and Ontario Hydro Brantford area sales representative Ken Richmond were adjudged top salesmen from among 35 utility and area sales representatives. The two men also received plaques for their office walls. □

Partnership broken

A long-standing partnership at Sudbury Hydro was broken at the polls last month when Wes Edwards, veteran commissioner and former president of District 9 of the OMEA, went down to defeat. However, E. C. (Ted) Dash, also a former District 9 president, was re-elected.

Roger Levert, a 30-year-old Sudbury-born electrical contractor making his second bid for election to the Hydro commission, ousted Mr. Edwards. □

Porridge power

Peterborough Utilities Commission has approved the purchase of the Quaker Oats Company's 68-year-old hydro-electric generating station for an undisclosed sum.

Decision on the 10-year-old question came on a 3-2 vote after a two-hour discussion. Opposition mainly centred on the plant's age. However, general manager W. H. Powell told his commission that purchase of the plant was not a gamble, claiming it was the "best on the river".

An engineering study by the H. G. Acres Company said the plant could be operated for another 28 years. □

New heating rules

New requirements for electric heating by the Canadian Standards Association have been adopted by the Ontario Electrical League together with a revised symbol for promotion and certification.

The new symbol features a bronze circular seal and the words "Medallion All-Electric — Live Better Electrically." The word

"Home," contained in the previous symbol, has been omitted to permit application to commercial, industrial and farm markets.

New guidelines stipulate procedures to be followed before the Medallion award is issued. Electricity must be the source of energy on the premises and all electrical equipment must be installed in accordance with the Ontario Electrical Safety Code.

An OEL representative must provide complete information to the customer so that he is fully aware of the requirements and procedures leading to certification. Heating estimates must be provided by the local Hydro representative before construction starts.

During construction and installation, the local Hydro will conduct periodic inspections of thermal insulation and other work as recommended by CSA.

The utility will also ensure that the system is operating properly and report any deficiencies to the contractor. In addition, it will keep records for a minimum of three years.

The Medallion seal assures the customer that his electric heating system has been installed in accordance with OEL recommendations.

Centennial's growing on him

Centennial projects for most Canadians are now little more than the memory of erecting a flag pole, planting a rock garden or giving up smoking. But not for Toronto Hydro's Sid Byatt, foreman in the underground cable section.

Sergeant-Major Byatt just retired from the Queen's Own Rifles and is still growing his Centennial project, and waxing it, and pointing it, twice a day.

Now, after four years of steady cultivation, he's the proud wearer of what may well be the longest, shiniest, most luxurious handlebar moustache in the country.

He says that in 1967, when the Colonel-in-Chief, Princess Alexandra, was coming to inspect the Queen's Own, the men grew moustaches "and, somehow, I just couldn't get around shaving mine off."

municipal briefs

Dr. R. H. Hay, of Kingston, chairman of the OMEA's power costing committee, has been appointed to the provincial government's Advisory Committee on Energy. The committee was set up to draft a long-range energy policy for the province.

A 42-year utility career has ended with the retirement of Leamington PUC's Hydro superintendent Harvey Wallace. Mr. Wallace joined the PUC in 1938 after several years with Ontario Hydro in the Essex and Kent areas.

Leamington PUC has named veteran employee Tony Critch to succeed Mr. Wallace. In another appointment, senior linemen Bill Galloway has been promoted to line foreman. Mr. Galloway has served as an AMEU instructor at the Orangeville linemen training school.

Tem or Tim? That's the question when it comes to the proper spelling of Temiskaming (Timiskaming?). In a letter to the Township, Attorney-General Allan Lawrence says that all statutes from 1927 on put the spelling as Timiskaming. Before that it was Temiskaming. But the Northern Daily News in Kirkland Lake says it was around before 1927. "We spell it Temiskaming and will keep on doing so," the newspaper adds.

Toronto Hydro has bidden farewell to two employees, each with more than 49 years' service. They are Harry O. Eames, a cable processing department employee who began his career in the accounting department, and William Lawrie, of the power service department.



as don wright sees it

we had to choose the two dates which are fraught with the most significance on our own personal calendar, we'd go for Labor Day and the 2nd of January.

September is the time of year when the youngsters are gathering up their pencils, notebooks, bubble-gum and other academic paraphernalia for another go at gathering enough knowledge to understand what a horrible state the world is in.

Some of this enthusiasm rubs off on the rest of us and with the end of another summer we seldom fail in our resolve to moulder the wheel, nose the grindstone and set the eye steadfast on the future.

It is a time for scanning the long list of extension courses published in the newspapers and for choosing among such mentalizers as the Care and Feeding of the Ethiopian Mudpuppies, Electronic Data Processing for the Retarded Adult and the Influence of the Human Wart on Behavioral Characteristics.

Some go so far as to attend a class or two, but for us it has usually been enough to revel in the prospects of knowledge to come and to compile a mental library of classics we won't read during the cold months to come.

Almost invariably, this recharging of the cranial batteries is accompanied by an equally strong urge for physical improvement. This starts out strongly with two or three fast turns around the dining room table and gradually peters out to beer and pretzels in front of the boob tube on Grey Cup Day.

We are rescued at this point by December which is ho, ho, ho month with the merriment increasing in tempo until we are borne over Christmas on the wings of fate and elan and dumped, ill, pills and pills, into the new year.

Excess is at the root of our renewed inspiration at this point on the calendar. Turkey is great, but not every day. Candy and liquor is quicker but both are bad for the constitution. Blessed are

they that give but cursed is the man who fails to live up to the terms of the Home Lover's Plan and his friendly department store.

January 1st is survival day and not given to contemplation and deep pondering into the meaning of things. He has accomplished enough who manages to arise long enough to greet the family on New Year's Day and to scratch out a dozen resolutions before being driven back to bed by the din of the cat stamping its feet on the deep pile of the living room rug.

The second day of January is the day of reckoning. Yesterday's resolutions can generally be ignored, but should be re-read in the stark light of reality on the off-chance that one or two might contain something more than the mindless remorse of a soul in torment.

'Tis a day for stock-taking and a good time to reach for a copy of War and Peace or Pilgrim's Progress even if one is only halfway through The Sensuous Woman. Two or three cautious laps around the piano stool are a good way to start a keep-fit program that will help one stand up to the winter ahead. Easter eggs, we must remember, are still only a glint in a mixed-up bunny's eye.

Resolved as we were to resist viewing with alarm so early in the new year, we cannot refrain from an exclamation or two of horror with regard to the work going on at the School of Botany at Nottingham University in the English midlands. Not content with the esoteric task of hybridizing plants or crossing animals with other animals of a different species, these fellows are hell-bent on merging animal cells with vegetable cells. Professor Edward Cocking is heading the venture and we don't particularly wish him luck.

In explaining the work, Professor Cocking points out that mice cells have already been crossed successfully with man cells to produce "man-mouse cells." But, the professor admits, "it has not been possible to grow up an organism from this particular combination."

Cheese! One hardly cares to contemplate a 200-pound mouse reading a book and smoking a pipe while keeping a wary eye peeled for the household cat. Surely the present hodge-podge of species is sufficient without adding to the confusion. Carrot-headed song sparrows and animated rutabagas we can do without.

Oh, we dig the significance, all right. If these mod scientists could cross a pumpkin with a corn plant, for example, they might just come up with a giant cob full of enormous kernels. Further cross-

breeding, say with a camel, could eliminate irrigation and fertilizing problems. Roaming at will across the desert, these nomadic corn cobs would reproduce naturally and provide a rich source of protein in an otherwise barren region.

But the whole idea is appalling. Making love to a luscious tomato is one thing – going to bed with some kind of crazy kumquat is another.

More down-to-earth is the work being undertaken by a pair of Israeli researchers into a cure for the common cold. Reporting at a recent meeting of the Society for Cryobiology (low-temperature research) they claim to have cured more than 100 people of their colds with the use of a machine they themselves invented. Chief purpose of the machine is to apply intense cold to the undersides of each patient's big toe.

Who cares about the rationale so long as it works? Patients taking the cure are advised to sleep alone. Extremities so treated are said to seek warmth involuntarily and from the nearest source.

One little item that came along too late for inclusion in our list of recommended electrical gifts for the man who has everything is the golf ball warmer. According to Business Week, heated golf balls will travel about 30 per cent farther than balls at ambient temperature.

A California company is taking advantage of this oddity by manufacturing Hot Balls – a battery-operated, rechargeable ball warmer that will keep three balls heated to the necessary 105 degrees F for a complete game. And golfers who contemplate warming their golf balls in the sun are doomed to disappointment. According to the magazine, they must be heated to the core.

On a non-related theme, the University of California Medical Center has come out with something new in men's fashions – lead-lined underwear shorts. The drawers, featuring a .25 mm lead-equivalent vinyl sheeting, are expected to be made available for radiology patients in five different sizes. Reduction in dose of 90 per cent at 80 kvp has been measured with a "phantom pelvis."

What do we mean – kvp? Frankly, we don't know but we'll get the lead out of our pants and find out. And if there are ghosts flitting about the campus in California, they might have the decency to run around whole – not in parts. □



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the cover

Fisheye lens captures the quiet urgency of Hydro's Richview Control Centre, hub of the provincial power network but also one of three nerve centres controlling the flow of power between 21 interconnected systems serving Ontario, New York State, New England and New Brunswick. A feature about the effectiveness of power pools begins on the opposite page.

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Preparing for change

It wasn't long after man had achieved his basic requirements for food shelter and clothing that he set out to satisfy his scarcely less primary needs for love, recognition and security. Of them all, security is perhaps the most elusive inasmuch as our most elaborate plans are subject to the whims of circumstance.

Attainable or not, security and the instinct for preservation are behind our resistance to change. Once having established a routine and a methodology we tend to regard change as a threat to security. One can always cope with the present method of doing things, but the unknown is something else again.

And yet change is inherent in the whole evolutionary process and it is one of the few phenomena we can be absolutely certain will continue to occur. Without change there can be no progress and without progress there is no meaning or future to human existence.

Being inevitable, change should be welcomed as a challenge and as a chance for improvement. Coping with change on the job calls for receptive attitude, eagerness to learn and a desire to play a role in the new scheme of things.

Looking back over the Hydro scene only so far as a score of years suggests that its people are well endowed with those qualities which allow them to cope with change and to take the initiative in implementing new ways of doing things.

Hydro set up its first full-scale computer system in 1957 and electronic data processing now assists in virtually all aspects of the operation from payroll and billing to engineering, research and operations. Inter-connections with other systems have been progressively expanded until Hydro now operates as part of a vast power pool supplying the major part of North America.

Among the world leaders for many years in the development of hydro-electric generation, Hydro has switched over almost entirely to thermal sources for power. Coping with change, the Commission now stands near the top in this field and has moved on to a predominant role in the new science of producing power from the atom.

At the municipal level, it should be recalled that the unique system of power distribution in the province was initiated by the municipalities and they have been equally resourceful in coping with new methods in meeting the surging demands for power over more than half a century.

Equally important re-adjustments undoubtedly lie ahead. Among them will be the changes to be introduced by Task Force Hydro in the near future. What form they will take is not yet known but they are likely to be innovative and their implications will involve the entire concept of power supply in the province.

Farthest advanced, and among the most significant of the Task Force studies, are the two dealing with the role and place of Hydro and the organization of Hydro. The first will involve such fundamental concepts as Hydro's regulatory function, its jurisdictional parameter and its relationship with government and with such bodies as customers and utilities.

The aim of the organization project is to determine practical principles of organization and to arrive at a plan for the implementation of these principles.

Recommendations in these two areas will be going up to the Task Force steering committee very shortly and they will be worked out and refined over the next few months.

Further observations on the progress of these all-important studies will be carried in subsequent issues of Hydro News as the specifics begin to emerge. □

THE BLACKOUT THAT NEVER WAS



Sagging transmission lines that came too close to a 25-foot Douglas fir literally sparked off a chain of events one sultry day last August that could have blacked out most of the Northeastern United States and Ontario.

It could have been a repeat of the great blackout of November 9, 1965, when about 30 million people were left without power, some for periods up to 24 hours.

It could, but it wasn't. Instead, only short interruptions or brownouts occurred in parts of New York State and New England. Ontario Hydro customers escaped with a few flickering lights despite the sudden loss at 4.30 p.m. on August 18 of 1,000,000 kilowatts.

A Hydro operations report summed it up this way: "No load (customer) loss occurred in Ontario."

The August 18 crisis was nipped in the bud through a whole series of preventive measures instituted since 1965 by 21 interconnected utilities serving the northeastern part of the continent.

Instead of chaos, subways and elevators purred during the evening rush hour and families had their dinner as usual, unaware of the drama being played out in distant control centres. None of the U.S. interruptions lasted longer than 42 minutes, and about 80 per cent of the disconnected power was restored in half that time.

The incident hardly rated notice in Toronto newspapers. But on August 20, the New York Times reported in headlines: "Northeast Blackout Halted This Time." A major trade magazine in the electrical industry, *Electrical World*, proclaimed: "Northeast Meets Major Test of System Security."

Indeed, the stronger system of collective security, which evolved in the wake of the 1965 blackout, limited the extent and duration of the interruptions in the northeast interconnection and led to quick restoration of power in affected areas.

Up to a point, the August 18 incident bears striking similarities to the 1965 disturbance that rippled across the northeast network. This time, however, the ripples stopped short.

Just what did happen? Data recorded by the computers in system control centres tell the story. About 4.30 p.m., a 345,000-volt line between Rochester and Syracuse sagged in the August heat and came too close to the Douglas fir — ironically on a Christmas tree farm designed to beautify the right-of-way. The resulting line-to-ground fault crippled this major east-west line, the backbone of interconnected utility systems in the New York power pool. (Unfortunately, an alternative 345,000-volt circuit was out of service for tower painting).

Twenty seconds after the current arced across from the tree, a 510,000-kilowatt nuclear unit tripped out of service in a completely unrelated event at Oswego, N.Y., creating what engineers call a "double contingency".

About four minutes later, a key transformer linking the New York power pool with the neighboring Pennsylvania-New Jersey-Maryland pool cut out. Subsequent events illustrate the advantages of co-ordinated efforts by interconnected utility systems to promote reliability of service.

The primary reason for power pools is to provide a high degree of reliability in the bulk power systems and to avert widespread interruptions. Another well-established advantage is the interchange of electric energy for economic reasons. Both features were evident on August 18.

The northeastern interconnection embraces three power pools — New England, New York State and Ontario — which are controlled from three master control centres. Together, they operate a three-in-one pool under the aegis of the Northeast Power Co-ordinating Council.

The council was formed in 1965 to increase reliability by simplifying control, co-ordination and communications between 20 utility systems with a combined capacity of 51,000,000 kilowatts. The New Brunswick Electric Power System joined the council late last year, bringing the number of members to 21.

If a power pool is strong enough, it can take almost any kind of shock. It's like a strong net. A heavy weight falling on a part will cause it to "stretch". But the hit directly by the weight transmits a portion of the strain to other parts, and the entire net helps absorb the shock.

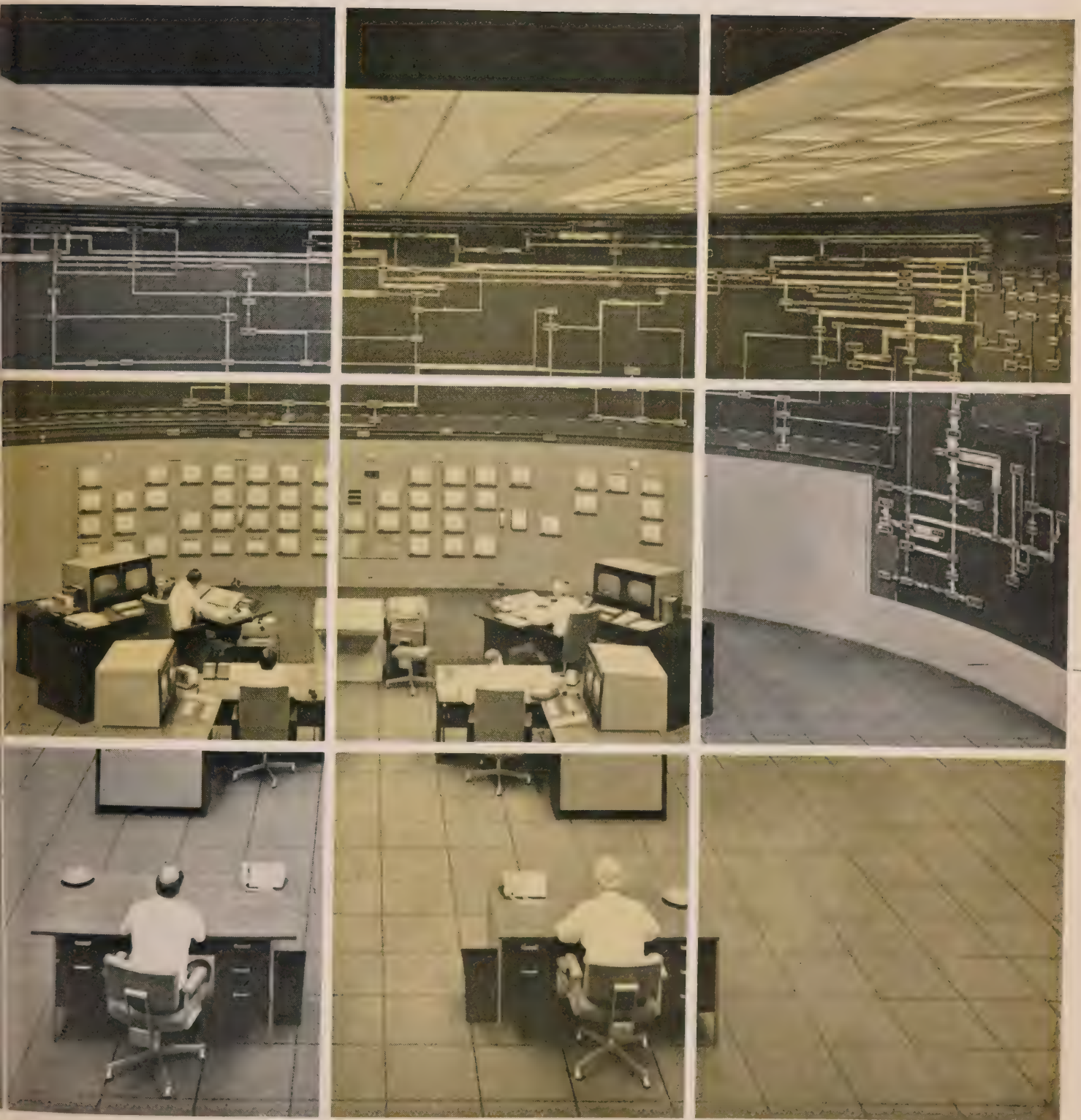
On August 18, the shock was caused by the combined loss of the extra high voltage line and a large nuclear unit. Power spilled into adjacent lines, overloading them and tripping circuit breakers. The northeastern interconnection split into several independent "operating islands". When such a split-up occurs, isolated power systems are vulnerable. A strong system is like a huge spinning wheel that requires a lot of force to stop. A smaller wheel can be more easily braked.

Power from the U.S. attempted to surge into the Ontario "pool" at Niagara Falls and Cornwall, but protective devices severed the connections between Hydro and New York State. At the same time, generating units automatically tripped out of service at Niagara Falls and at Cornwall and Beauharnois on the St. Lawrence River. For a few minutes, Hydro was 1,000,000 kilowatts short of meeting power demands.

However, the Ontario system remained interconnected with the Michigan power pool and through Michigan with the rest of the vast interconnected grid which covers most of the U.S. and parts of Canada.

"Without that lifeline, Ontario could have suffered a power interruption which would have affected most power users in the

...er control centre for New York Power Pool,
...ted near Schenectady, New York, played key
...last August 18 in averting a widespread
...kout and in quick power restoration to
...ected areas.



province, including industry and transit systems," said Jim Harris, Hydro's system supervising engineer.

Prior to 4.30 p.m., Hydro was exporting about 500,000 kilowatts to Michigan over interconnected lines. But when the shock came, the routine power flow into Michigan quickly reversed and an additional 500,000 kilowatts poured into Ontario from Michigan to make up for the loss of several generating units.

But the need for imported power was only temporary. Five minutes after the disturbance, Hydro had restored the tripped generating units to service. Within 18 minutes, power output and demands in Ontario were again in balance.

System supervisors at the Richview control centre in Etobicoke then directed their efforts to helping restore the important links with their New York State and New England partners.

The New England and New York power pools contributed to a quick recovery by promptly disconnecting load on a pre-selected basis through automatic devices or by reducing voltage, and by stepping up power output to restore frequency to a normal level. The Maritime power pool (with which Ontario Hydro is linked through U.S. systems) also helped out.

Without such actions, the strain on generators in the densely-populated New York City area would have been great enough to burn out generators as in 1965. Devices installed since 1965 prevented that, and this time fast-starting gas turbine units whirled into action to pick up the slack.

One of the measures taken was to energize the Rochester-Syracuse EHV circuit, out of action for tower painting, to restore east-west flows across New York State.

By 5.25 p.m., Ontario Hydro ties at Niagara and Cornwall were back in service and

normal power flows resumed. Frequency returned to a healthy 60 Hertz (cycles per second), indicating all interconnected generators were again working in unison.

Joseph C. Swidler, chairman of the New York State Public Service Commission, said the incident provided "the first major test" of equipment installed to prevent major blackouts.

"The automatic devices appear to have prevented what might have been a major interruption of service in the state, and resulted instead in an orderly reduction of load in pre-selected areas for periods up to 42 minutes," said Mr. Swidler.

In all, about 137,000 customers were affected, mainly on Long Island, N.Y.

Indicating the growing reliability of the northeast network, additional measures set out in emergency procedures could have been taken on August 18. But they weren't even necessary.

One of the most significant steps since 1965 has been the setting up of master control centres for the New York Pool near Albany, N.Y., and for New England systems at West Springfield, Mass. These new centres replace a number that existed previously and are linked directly or indirectly to Ontario Hydro's Richview centre.

The control centres are linked by sophisticated communications systems to monitor power flows and to foster quick preventive or corrective operating action.

Links between the control centres include special telephone and high-speed teletype circuits and all three are equipped with on-line computers to monitor bulk power flows on vital interconnections. These centres, in turn, are linked with neighboring groups of utility systems, which have also joined forces to promote reliability.

The interconnected utility systems have chalked up a long list of measures to

eliminate weak links and strengthen the chain. New EHV lines have been completed which permit the transfer of large quantities of power and conserve space rights-of-way. A 500,000-volt line, for example, has four times the power-carrying capacity of a 230,000-volt line.

Other major additions to EHV transmission facilities are planned through 1976, including 860 miles of 500,000-volt and 2,380 miles of 345,000-volt line. Two major lines in New York State, including a spur extending into Massachusetts, will ultimately operate at 765,000 volts.

The world's first underground gas-insulated line, operating at 345,000 volts, will form part of the tie line between the Pennsylvania-New Jersey-Maryland (PJM) 500,000-volt system and the New York-New England 345,000-volt grid.

These additions, along with other new transmission lines operating at lower voltages, will strengthen the backbone of the interconnected region to meet future expansion. It is expected that the winter generating capacity of the region will approximately double during the 1970s to about 100 million kilowatts in 1980.

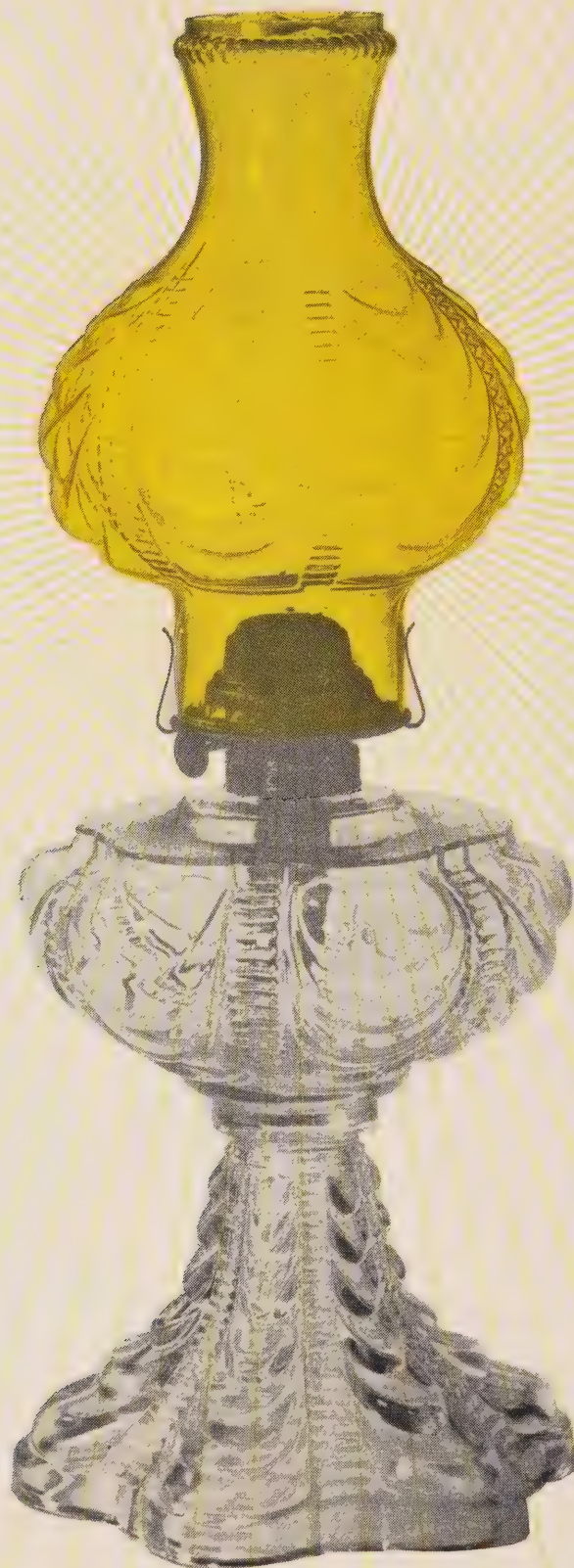
Top-level co-ordination of NPCC planning initiated in 1965, is now well established. All member systems prepare for future growth by co-ordinating well in advance the addition of new facilities, such as lines, major generating stations and communications links. For this reason, the NPCC will play an increasingly important role in promoting reliability of service in future years.

On August 18, 1971, the northeast interconnection met a crucial test. The success of that operation underlines the growing strength of inter-system ties and augurs well for the future. It also points up the need for greater interdependence as utility systems grow in size and complexity.

System supervisor is the key man at Richview
Control Centre when trouble occurs on
hydro's interconnections. Here, Donald Bylund
monitors critical power flows between neighboring
utility systems.



FROM FIREFLIES TO EDISON



by Elizabeth Kimball

... batch of fireflies. Peel a rush
 had a string through a dead bird's body,
 stuff moss into a defunct auk's belly.
 Squeeze a nut until it drips. Fill a sea shell
 with fish oil.

Wait until the 20th century and flick a
 switch to illuminate your home . . .
 Look back with grateful wonder at these
 the scores of other ingenious means
 whereby our ancestors beat back the
 darkness of cave, cottage and castle.

Probably, artificial light was dis-
 covered by accident. When prehistoric man
 made camp, he carried with him fire,
 a precious provider of warmth and of cooked
 food. Perhaps he observed that his fire-
 brand lit his path at night. At any
 rate, lighted splints were one of the earliest
 methods of illumination. Stone Age lamps,
 made from hollow stones or from sea
 shells, probably originated when man first
 noticed that fat, dripping from his roasting
 stick, ignited.

In spite of these ancient beginnings,
 the evolution of illumination has been slow,
 with frequent back-slidings, frustrating
 detours and fruitless meanderings into

*... was the only attribute of this centre-draft,
 burning lamp while the painted glass lamp
 an object fit to grace any nineteenth-century
 room.*

dead-end alleys. For example, a type of
 lamp invented 2,500 years ago by the
 Egyptians was shelved until the 18th
 century, to be re-invented all over again.

Apparently, too, our great-grandparents'
 homes were lighted by very much the
 same means as those of the Greeks and the
 Romans in the heydays of their eras. This
 seemingly haphazard course of lighting's
 history was due in part to the fact that
 early man could not easily swap ideas with
 a neighbor even 500 miles from him. And
 that most fuels being edible, light was a
 luxury when the supply was scant.

The main methods of domestic lighting
 through the ages that preceded electricity
 were: wood-burning devices, candles,
 lamps and gas lights. Early man set tree
 branches afire for light or, later, split them
 into splinters and bound them into torches.

In medieval Europe, and even today in
 the Deep South, long splinters of pitch-
 bearing wood are used outdoors. In 15th-
 century Sweden, such lights were carried
 beneath the belt, tucked into the hatband,
 or held in the mouth!

In the Middle Ages, these lights were
 described as candles, and so-called
 "candelabra" in the United States National
 Museum were actually holders for splints.

New Englanders, who adopted the use of
 splints from the Indians, called them
 "candlewood."

Properly speaking, though, a candle in
 early times was a light made of tallow or
 wax and, later, a cylinder of tallow or wax
 with a cotton or linen wick. The early
 definition includes rushes dipped into
 wax; and tapers, or lengths of rope or cloth
 soaked in fat, wax or pitch; and flam-
 beaux.

The earliest upright candles were generally
 rushlights, made from peeled rushes
 dipped into fat or wax. They were popular
 in King Alfred's time (900 AD) and well
 into the 19th century in Europe and
 England.

Rushlights were cheaper than cotton wick
 candles, and needed no trimming or
 snuffing. In the 18th century, an improved
 braided wick, which snuffed itself as it
 burned, greatly increased the popularity
 of the wick candle.

Until very recently, the poor man's candle
 has always been tallow or fat, for only the

For all photographs published with this
 article, we are indebted to Loris S. Russell
 and his book "A heritage of light"
 (University of Toronto Press).



wealthy could afford other waxes . . . from bees in medieval times; from the fragrant bayberry or the sperm whale's head in 18th-century North America. Nineteenth century laborers and farmers on this continent considered the new stearine and paraffin candles an extravagance, as they could make as many as 300 candles from the suet of one ox.

Oil and grease lamps showed practically no improvement in design from the fall of the Roman Empire until about 1700 AD. During this long period, much the same type of lamp was in use throughout the civilized world. In the Mediterranean and East, where olive oil was plentiful and remained fluid in those warm climates, they were made of clay. In Central and Northern Europe, they were constructed of metal to withstand the heat necessary to melt fats which solidified in the cold months. On the other hand, candles, which melted easily, were impractical in warmer climates, but were popular in Northern Europe, as were wooden lighting devices.

Early oil lamps were called float lamps, because the wick (which evolved from plant fibre to cotton or linen) was floated on the surface of the oil. Originating over 5,000 years ago, float lamps have been revived today as table lamps in some parts of the West Indies.

While 4,500 years ago the inhabitants of the Persian Gulf passed wicks through the channels of sea shell lamps, the first manufactured wick channel lamps were of clay or metal. This type was called a crusie and was essentially a narrow oval dish with a handle, pointed at one end to support a wick. In Canada, and parts of Europe, crusies were suspended by an iron pin shaped like a gaff hook.

American and Upper Canada settlers used them, with lard or tallow, but preferred the betty lamp — an improved crusie with a trough for the wick inside the rim.

In the 1700's, clear oils such as whale and spermaceti were in plentiful supply, particularly in North America. The clear glass lamps which held them cast much less shadow than metal or pottery vessels. Glass makers vied with each other in turning out more and more elegant lamps and shades.

Oil lamps became more efficient mechanically, too. In 1784, Ami Argand, a Swiss, invented a method of getting the air current inside the flame, thus enormously increasing the amount of light diffused. Benjamin Franklin is credited with having first demonstrated that two wicks together provide more light than two wicks separated. A tight oil font was designed to prevent dangerous spilling should a lamp

overturn. In these, and scores of other advances, oil lighting reached a higher peak of efficiency than it had achieved the preceding millennium.

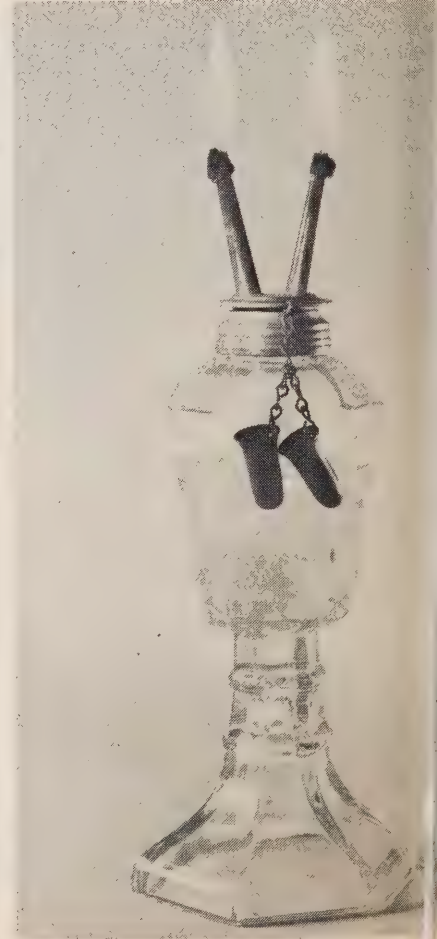
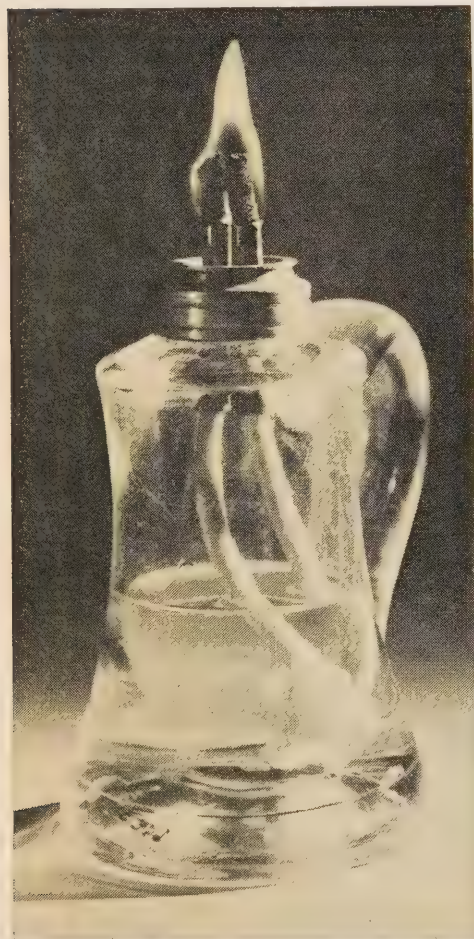
But around 1840, the whale oil industry began to decline and cheaper fuels were again sought. Householders fell back upon lard lamps, now featuring an improved flow, but still made of homely metal.

An exception was the elegant solar lamp with its clear glass vase around the burner, an etched glass globe and, often, sparkling pendants.

Burning fluid, a mixture of turpentine and alcohol, was popular for a brief time. Yet it was expensive and dangerous and shortly to be supplanted by a fluid which, in lamps, one authority states unequivocally were ". . . the best oil-burning lighting device the world has ever known."

This was kerosene, the mutual, though independent, discovery in the 1840's by Dr. Abraham Gesner, of Halifax, N.S., James Young, of England.

Glass hand lamp on left and metal kyal, or Cod lamp, of New England origin, burned whale and fish oil respectively. Double-wick lamp burned a mixture of alcohol and rectified turpentine.



...st kerosene was made by distilling
...and was relatively expensive, but
...roleum, initially drilled in 1859, pro-
...d a cheaper base for the new illuminant.
1861, most Canadians were lighting
...r homes with kerosene lamps.

...what of gaslight, whose soft romantic
...t is synonymous with a whole decade
...story? Used as an illuminant since
...5, when an Englishman named
...dding piped coal gas into his office
...n a nearby mine, it did not come to the
...ted States until 1816 and the first
...adian gas company was not founded
...1840.

...ngland, the wealthy and the chic had
...un to switch to gas as early as 1779,
...the difficulty of installation made it
...tical only in large centres of population.

...ough experiments in electric lighting
...e begun as early as 1709, it was not
...d domestically until 1840 when
...Moleyns, of England, patented the first
...nent lamp and a man named Grove
...ally read by the light of a platinum
...filament covered by a glass tumbler
...ed upside down over a dish of water.

...American, J. W. Starr's, concept of a
...on filament enclosed in a vacuum

...inspired Joseph Wilson Swan, of England,
...to start the experiments which resulted in
...the first practical electric lamp.

Edison patented his carbon filament lamp
in 1879, and publicly demonstrated it in
January, 1880, but Swan's demonstration
of an incandescent lamp using a carbon
filament had taken place, though with
less fanfare, in 1878. The two men later
joined forces to form a company for the
manufacture of domestic electric lamps.

Edison's demonstration lamp was almost
as large as a man's hand and it fitted
into a socket which rested flat on a table.
It could also be fitted into a converted
wall gaslight bracket.

Subsequent improvements, both by
Edison and his many competitors, were
primarily in the lamp base. Today's screw-
in socket is very like that used in Edison's
improved 1881 model. The flask-shaped
bulb became shorter and the end rounded,
with no "pip." By the early 1900's, bulbs
were frosted to cut down on glare.

Gas fixtures were often converted into
electric fixtures and designers of the early
"electroliers" modelled them after the
rococo and over-ornamented gasoliers of
the Victorian and Edwardian eras. Wall
brackets were almost exact duplicates of

gas wall brackets. Even the switch which
turned on the early electric lamps was very
like the butterfly nut on a gas fixture.

Light bulbs could be ordered in cut glass,
and shades were magnificent and fanciful
affairs. Stained glass in ornamented metal
frames featured flowers, waterfalls,
nymphs and other romantic motifs. Heraldic
beasts, knights in armor and languorous
nymphs, in brass or bronze, were popular
for standing fixtures. Poorer homes had
to satisfy themselves with a single bulb
suspended from the ceiling, or with table
and stand lamps of much simpler design.

Until electricity became more widespread,
most rural homes had to stick with kero-
sene, so it is not surprising that many of
these lamps have been discovered, by
antique hunters, in old farmhouses.

Now so popular an item with young home-
makers that their reproductions are seen
even in hardware shops, their beams may,
for the curious, lighten a path that leads
back to the hollowed stone and sea shell
lamps of our ancestors. □

*Kerosene lamp, left, dates from early 1860's.
Eight-burner "gasselier" hangs in the living room
of the William Lyon Mackenzie House in Toronto.*



WHEN WHITE RIVER HIT 72° BELOW





and the only appliance was a small hot plate

Rae Hopkins

weathered red, white and blue neon faces the Trans-Canada Highway in southwestern Ontario telling the traveller who has arrived at White River, the coldest town in the nation.

A large thermometer running down one side of the sign is marked at 72 degrees below zero – the point at which the mercury would freeze on a thermometer affixed to the front of the general store in this community one chill morning 37 years ago.

Whether the temperature actually dipped below minus 72 on January 23, 1935, is said to come to be fact; by others to be fantasy. D. V. Rumsey, the man who owned the store, did take a snapshot of the mercury at the time.

Enterprising businessman was Mr. Rumsey. He had the prints enlarged to card size, immediately claimed the

national cold spot record and put the community on the map. From that time on, the tourist trade has boomed in White River. Especially so in the last 14 years since Highway 17 was punched through rock and bush to forge the final link in a road that girdles Canada.

Another thermometer recorded a reading on that raw January morning of 61.2 degrees below zero. But whichever one was correct, no one denies that it was a cold, cold day.

One person who recalls seeing the reading on Mr. Rumsey's thermometer was improvement district chairman Naldo Bracci. Perhaps the person most responsible for the coming of Ontario Hydro to White River back in 1958, Mr. Bracci also remembers the half-dozen or so dim street-lights that didn't work most of the

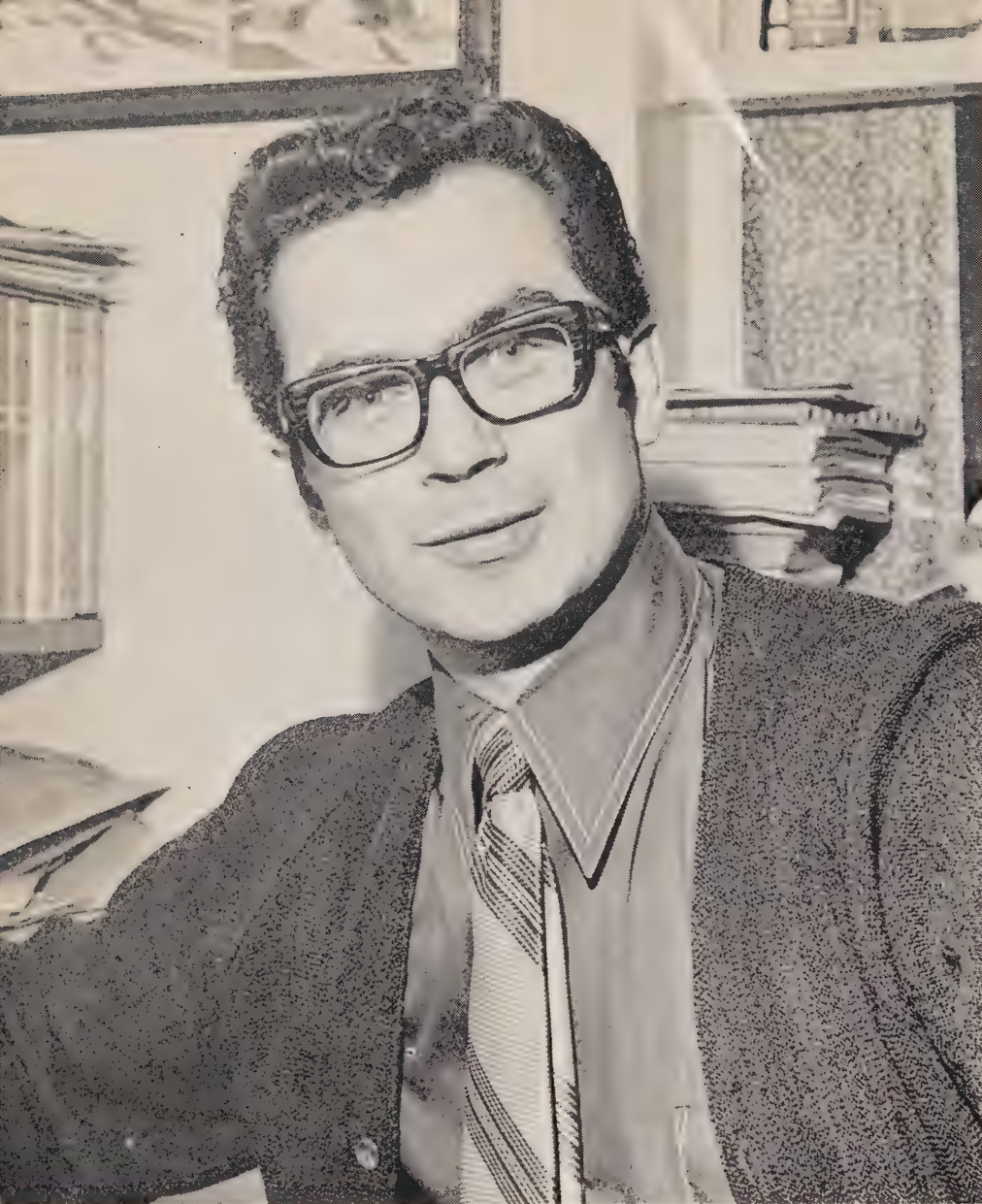
Typical sub-zero day in White River was captured in this photo taken long before the Trans-Canada Highway opened up the community to tourists.

time, the stubborn AC generators he used to operate to run his movie theatre and the DC railway power that lighted his hotel, motel and home.

"The frustrations were many back in those days," says 48-year-old Mr. Bracci. "There was no way White River could progress, for we just didn't have a supply of electric power available to potential developers."

Ralph Marchand, secretary-treasurer of the improvement district, also remembers the cold winter mornings of his youth. He had a childhood dream of owning an electric train, but "back in those days we didn't have the power to run one."

Until Ontario Hydro took over electrical distribution in White River and set up a local system there, power was supplied to the community from steam-driven



Electric ranges were unheard of. We had wood stoves, recalls Ralph Marchand.



generators on an "if, as, and when available basis" through the CPR.

"As a matter of fact," says Mr. Marchand, "the only appliance we could have in the house was a hot plate, and not a very big one at that. Electric ranges were unheard of — we had wood stoves — and they used to tell us not to run the Christmas tree lights too long at any one time in case the power supply ran out."

"Refrigeration," he adds, "was something else. It was all ice boxes in those days. The only refrigerator that would work was a DC model — and you just couldn't get them. Later, however, we did get a fridge which used either coal oil or propane. But it wasn't very reliable."

Among the others who remember White River in the days before the coming of

Highway 17 and Ontario Hydro is Jack Phillips, who recalls having to enter the community aboard a ferry operated on the White River narrows by the Ontario Department of Highways.

"It closed down early in the evening, and if you missed it you'd have to go back to your departure point and try again in the morning. Sometimes you'd have to travel right back to Terrace Bay to get accommodation," he says.

And Bob Forbes, Ontario Hydro consumer service and sales superintendent, remembers well that night the new street lights were first switched on. "Every kid in town came out to play shinny under the lights," he says.

Certainly, things have changed since those days when White River was simply a divisional point on the CPR's main line. Now, for instance, about 30 per cent of the work force is employed by the Department of Lands and Forests.

Chief Ranger Ray Patrick says the divisional office covers about 3,800 square miles of bush. Lands and Forests personnel oversee the extraction of pulpwood and all work related to the removal of wood from the forests, including reforestation programs, to ensure a continuous supply.

Fish and wildlife supervisor E. A. Poole is responsible for all species of wildlife in an even greater area of 12,000 square miles. Here moose, bear, caribou, beaver, fisher, martin, lynx, otter and mink are the hunter and trapper. And there's the



On an average weekend, 150 sportsmen will fly off in search of fish or game.

business in lake trout, herring and whitefish for the commercial fisherman in Lake Superior.

Pozzo says about 700 moose a year are taken out of the area by hunters using White River as a jumping-off point. "It's here they come to arrange their fly-in hunting and fishing trips."

He and Mr. Patrick agree that the biggest problem Lands and Forests staffers face is garbage. The Trans-Canada brought an influx of campers, and many of them forget that litter has no more place in the wilderness than it does in the city.

White River is also the home of a thriving float plane airline. White River Air Service began in 1951 with a single aircraft. Now it has 15 planes ranging from float-equipped

Cessnas to Otters and Beavers. It flies hunters and fishermen as far north as Hudson Bay.

President Stan Deluce says the average weekend will see as many as 150 sportsmen flown into the wilderness. Most of the tourist trade is from Michigan.

Living conditions have changed drastically since Ontario Hydro took over electrical distribution and built a 58-mile line to serve the community.

From a hamlet with barely enough power to keep the home lights burning — the average consumption was something in the order of 100 kilowatt-hours a year — White River has emerged as one of the centres of highest per capita consumption in the province. Now homeowners use about 10,000 kilowatt-hours a year.

Nearly all the community's new homes are all-electric.

Ralph Marchand owns an all-electric house. He built it last year and says he wouldn't have anything else. "There are approximately 20 electrically-heated homes in town. Three new homes out of every four built in White River today are all-electric."

"The largest apartment building here — it belongs to Mr. Bracci — is electrically-heated, too. So is our new 11-room municipal building. Many other people have already converted to electric heat or are in the process of converting," he says. Mr. Marchand has even fulfilled that childhood dream of an electric train.

It belongs to his four-year-old son, Paul.

NANTICOKE



COMES ON LINE

th no fanfare, no loud cheering, and most unnoticed by the army of construction forces on the site, Nanticoke generation station took a deep electrical breath last month and started producing power for Ontario's consumers.

The occasion marked the culmination of an exhaustive series of tests on equipment associated with the first of eight 500,000-horsepower generating units. It came almost as an anti-climax to a construction project that began in 1968 and gave jobs to 10,000 at its peak.

Those men could tell a fascinating tale. For example, the way they reclaimed part of the 760-acre site from Lake Erie by building a 4,800-foot cofferdam. And the way in which they pushed two 655-foot stacks to their full height in less than 100 working weeks. Both stacks contain more than 5,500 cubic yards of concrete and were built around the clock using slip-form techniques.

Pollution control figures large in the station's design. Everything possible has been done to minimize air pollution while an intensive and continuing lake study program will determine what impact thermal discharge will have on aquatic organisms.

Ash is collected in the station's electrostatic precipitators, rated 99.5 per cent efficient, and together with bottom ash from the furnaces is mixed with water and pumped to a 185-acre lagoon big enough to hold all the ash produced over a 30-year period.

Nanticoke is an ideal site for a large thermal-electric plant. For one thing, there's an abundant supply of fresh, cold water for cooling purposes. The site's hard rock strata are also ideal for supporting heavy equipment associated with a project of this magnitude.

And there's economy. The station is located directly across the lake from U.S. coal storage depots and ports, saving millions



Both inside and out, construction at Nanticoke moves ahead toward the day in 1977 when the station will produce full power. Coal is delivered to the site in self-unloading ships. Stack is one of two which reach up 655 feet, effectively dispersing flue gases.



of dollars in shipping costs. Transmission costs are reduced because the station is near centres of high electrical demand in Ontario's Golden Horseshoe.

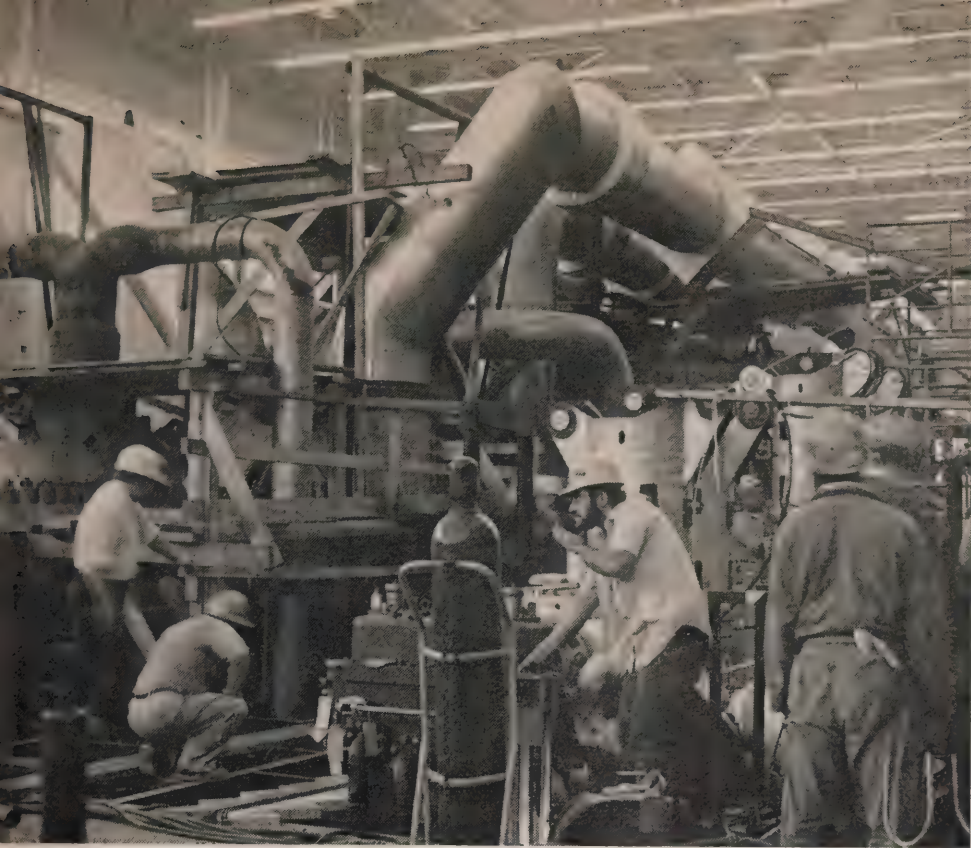
Nanticoke is highly automated. Station computers monitor data at hundreds of points, providing operators with performance information and warning them of any deviations from normal. Computers also provide automatic turbine run-up, initiate the reclaiming of coal from the stockpile and supervise the filling of the coal bunkers.

Reclaiming and moving the 1,520 tons of coal that will be burned each hour when the station is operating at full capacity is a complicated task. It will be handled by two specially designed stacker-reclaimer machines that maintain the 5,000,000-ton capacity stockpile and transfer the fuel to the powerhouse.

Coal is delivered to the site in 25,000-ton, self-unloading ships, each equipped with a 250-foot boom which discharges into a receiving hopper at the end of the 1,000-foot-long slip dock. Two conveyers, each with a 3,000-ton-an-hour capacity, move the coal to the transfer house, where it can either be fed to the stockpile or directly to the powerhouse bunkers.

Nanticoke is really a refinement of other large coal-burning stations in the Ontario Hydro system. The basic purpose is the same, too . . . to provide Ontario with sufficient electricity to meet its needs in the years ahead. □





How well do you know



your friendly credit union?

Credit unions will help Canadians get betrothed, married, divorced or buried. They'll help put members on wheels, into boats or on flyaway jaunts to exotic locations.

by Nalini Stewart

Who do you think will lend you money to cover the cost of declaring personal bankruptcy?

Ask your friendly credit union.

Nervy though the request may sound, it is often made and, according to G. J. Raycroft, assistant general manager of the Ontario Credit Union League, a few such loans have actually been approved.

Credit unions will also help Canadians get betrothed, married, divorced or buried. They will help put members on wheels, into boats, or into the sky for jumbo jaunts abroad.

Credit unions are people's banks formed when a group of individuals with a common bond get together and pool their savings to make loans at low interest to members.

One in every four Canadians belongs to a credit union. In Ontario alone, there are 1,454 credit unions with assets of \$870,424,000 and just under a million members. Hepcoe, the Ontario Hydro employees' credit union, like the others, owes its success to the service it renders. It was established in 1942 with assets of \$926 and 61 members. Today, as the second largest credit union in Ontario, it has over 25,000 members and assets of \$40 million.

"Our members are saving money at a rate of approximately \$240,000 a week," says Stewart Sciberas, the office manager. "And that's just through payroll deductions. It doesn't include deposits made over the counter."

In contrast, about \$250,000 is collected each week in the same manner for the repayment of loans and mortgages. Because of its size, Hepcoe is able to offer personal loans as high as \$10,000 and first mortgages of \$25,000.

"Many of our members have been able to buy homes in the difficult Toronto market, even though they have lacked sufficient money for a down payment," says Frank Horrigan, Hepcoe's loan manager. "In some cases, personal loans help make up the difference."

In 1970, members borrowed in excess of \$12 million, about 25 per cent of it for real estate.

Loans are made for virtually anything, including cars, appliances, home repairs and even for investment purposes.

Hepcoe offers more than just direct financial services to its members. Consumer buying information is distributed periodically and members have also re-

ceived advice on co-operative retail outlets.

Hepcoe operates its own group charter travel club and members can participate in a wide variety of travel programs each year. If they don't happen to have the ready cash, they can usually get it from Hepcoe. Several charters to London and Europe are arranged each year as well trips to the Caribbean and other exotic resort areas.

With a full-time staff of 29, Hepcoe maintains two offices. The main one is on University Avenue, Toronto, and the branch office is located at 77 Bloor St. West, where Hydro recently acquired rented accommodation. In addition, Hepcoe has more than 150 volunteer agents throughout the province who act on behalf of members.

While a person must be a Hydro employee or the husband or wife of an employee to join Hepcoe, he does not have to turn in his membership if he leaves or retires from the Commission. More than 1,800 memberships are also held in trust for employees' children.

Hepcoe has no community charter arrangements, but is interested in the expansion of the movement in Ontario. In this respect



for the past two years it has helped the Richmond Hill Community Credit Union in its development stages. Mr. Sciberas also sits on that organization's board of directors.

The credit union movement dates back to 1847 when Friedrich Raiffeisen, the Lutheran mayor of a small German town, started pooling the modest savings of his community and lending the money to those who needed credit. The plan worked so well that by the time of his death in 1888 he had helped to create 423 credit unions.

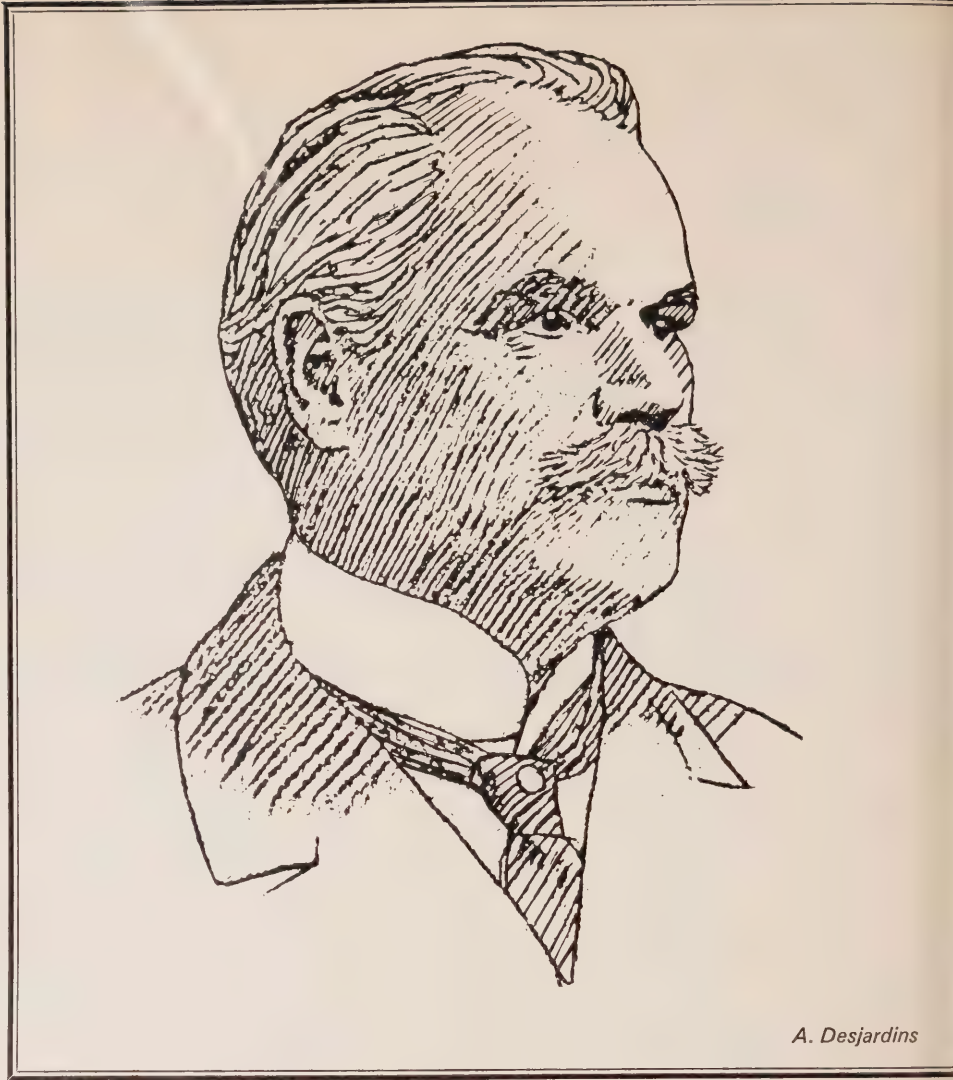
Slowly, the idea spread and in 1900 was brought to North America by a parliamentary reporter, Alphonse Desjardins, who had listened to many debates on usury in the Quebec Legislature, including complaints that loan sharks were demanding 50 or 60 per cent annually. Desjardins learned everything he could about the movement in Europe, then called a meeting of his neighbors in the small town of Levis, and outlined his plan for starting a *caisse populaire*.

Three weeks later, he opened La Caisse Populaire de Levis in his own home with deposits totalling \$26.40. Within five years, the operating capital had jumped to \$40,000 and this amount was lent over and over again without a dime's loss. Today, more than three million Quebecers have put their faith in the *caisses*, whose assets exceed \$2 billion.

The *caisses* developed in parochial and pastoral societies, often in communities that didn't have banks, and they're deeply embedded in French-Canadian society. But the movement came to the rest of Canada from the United States.

In 1908, Desjardins was invited to Boston to help draw up credit union legislation for the state of Massachusetts. In Boston, he met a philanthropic merchant, Edward Filene, who had followed the movement in India and was much impressed. Filene donated a million dollars for organizing and legislating credit unions across the United States.

It was not until 1931 that Ontario's first credit union was formed at the Plymouth Cordage Co. in Welland. Ontario credit unions followed the U.S. pattern of having an occupational bond rather than the parish or community bond. In Quebec, religion and language joined communities. In the Maritimes, fishing was a common interest. In the Prairies (where credit unions were nicknamed penny banks) there was agriculture. In Ontario, the dominating factor was industry. So



A. Desjardins

Hepcoe-type credit unions became the rule.

Immigration in the fifties boosted membership as ethnic credit unions sprang up across the country. The Polish credit union, St. Stanislaus Parish (Toronto), is considered the largest parish credit union in the world with 11,500 members and assets of \$12.5 million. The Czechs have them, the Finns have them, the Croatians have them, and the Jamaicans, too. The Ukrainians have more credit unions than any other ethnic group in the province. There are credit unions for cabbies, hatters, policemen and L.C.B.O. employees. And St. Stanislaus (or St. Stan's as members call it) even has one for children.

Jan Stocker, general manager of St. Stan's, explains that they have a junior credit union for children between the ages of five and 14. The youngsters elect their own board of five directors and learn about the operations of a credit committee. At present, they have 650 junior bankers who've amassed savings of \$50,000. St. Stan's also has a youth credit union which has issued 36 university loans.

After the Second World War, credit unions and *caisses* grew faster in Ontario than their competitors in the financial system. Their attractive loan rates (by law they may charge no more than 1 per cent a month) and the fact that credit was available on reputation, made them the average guy's best bank. In most cases, credit union loans are insured. New Ontario legislation permitting credit unions to greatly expand their membership and even open their doors to the community at large is making it possible for thousands of people, who otherwise would not be eligible, to participate in the movement.

Explains W. M. Jaffray, director of the credit unions branch of the Department of Financial and Commercial Affairs: "Ontario credit unions will now be able to expand by going through a consolidation phase merging uneconomical smaller operations with larger professionally-managed credit unions. These larger ones will have the financial capacity to offer a wider range of services."

...sonse Desjardins, a reporter in the Quebec legislature, brought the idea of credit unions to North America from Europe, where the movement was started in 1847 by Friedrich Raiffeisen.

The Ontario Credit Union League helps with dissolutions and mergers. From January to October this year, the provincial government granted charters to seven new credit unions, but 46 were dissolved at the same time and there were nine amalgamations. There are still about 600 credit unions in the province with assets ranging up to \$100,000 each.

New services will include branch offices. So far, the department has frowned on branch operations although several large credit unions such as the Ontario Telephone Employees Credit Union and St. Catharines, a Dutch diocese credit union serving the Windsor, London, Sarnia area, operate branches. The Niagara Township Credit Union has two large branches and Hepco opened its first branch office last May.

Also on the way are more credit unions with chequing facilities. Clint Crosswell, of the Ontario Credit Union League, says that they're now talking about a common method of banking. Credit unions hope to have their own nationwide bank and their own nationwide trust company. They're also discussing a system of CU-cheques (pronounced Q-cheques) that could be cashed by any credit union across Canada. These are already in use in the west.

The broadened sphere of business will, of course, limit the personal contact feature of credit unions and bring a tightening of operation. One possibility would be that each credit union will be made to contribute 1 per cent of its share capital and deposits to a stabilization fund. This will make the fund large enough to pay up shareholders should a major credit union go bankrupt.

The OCUL does have a voluntary stabilization fund, but this adds up to just one-tenth of 1 per cent of deposits. It must be admitted, however, that so far this fund has been large enough to immediately pay up shareholders when credit unions have dissolved. There'll also be stricter external supervision and auditing.

Age, urban people's banks — "not for profit, not for charity, but for service" — are the dream of men like Raiffeisen, Desjardins and Filene. And they're fast becoming a reality for many Canadians.



F. Raiffeisen

Utilities have them, too . . .

Many municipal utility employees in Ontario are eligible for membership in credit unions, usually in conjunction with other municipal employee groups. And in a few instances, utilities have formed their own credit union.

In Ottawa, one credit union serves employees of Ottawa Hydro as well as those in neighboring Nepean and Gloucester townships. This group, HECO, was formed in 1963. In 1969, members voted to change the charter to accommodate employees of Gloucester and Nepean hydros.

"We felt it was one way to provide employees of our neighboring utilities with the credit union service. Because of their size they would never be able to form their own," says treasurer Robert Burbidge.

The Ottawa credit union picked up 75 new members, 27 from Gloucester and 48 from Nepean, as a result of the change. It now has 476 members and assets of \$345,000.

Another group, the Etobicoke Utilities Employees Credit Union, has mushroomed in the past year because of the implementation of a payroll deduction program.

In 1969, the Etobicoke group was one of the smallest credit unions with only 74 members. When it switched to payroll deductions in 1970, the membership soared to 200 in a matter of months.

Evans Munckton, a spokesman for the credit union, says: "We couldn't seem to get employees interested in coming in regularly and depositing money over the counter. As soon as payroll deductions started, we were swamped with applications." A similar situation developed in Windsor when the utility credit union went on payroll deduction last fall.

Among other municipal utility credit unions in the province are those operated by Hamilton and Toronto hydros. The Toronto organization is the largest of the utility groups with more than 2,000 members. □

along hydro lines

Heavy water offer

Atomic Energy of Canada Limited has received an offer from the Soviet Union to supply 130 tons of heavy water for Canadian nuclear power stations over the next two years.

The offer, made by Technabexport, a Soviet government trading agency, follows the visit to Canada last October of Soviet Premier Alexei Kosygin. Mr. Kosygin toured Ontario Hydro's Pickering nuclear power plant at the time.

The possibility of Canada obtaining heavy water from the Russians was raised during talks between Prime Minister Trudeau and Mr. Kosygin. Their talks paved the way for discussions between AECL officials and V. N. Myshkov, head of the USSR's trade representation in Canada.

Senior AECL officers were to go to Moscow this month to negotiate the price and delivery schedule of the heavy water should the decision be made to take it. Already in Canada are 52 tons of heavy water previously purchased by AECL from Technabexport and delivered last year.

The Soviet offer comes at an opportune time. Only one of two heavy water plants that should be in full production in Canada is in operation. As a result, there is a prospect of a shortage until Canadian production is able to satisfy the demand in two or three years' time.

The most pressing need for heavy water is for the third and fourth units at Pickering. The third unit is scheduled to begin operation this year and Unit 4 is due on the line next year. Each will require more than 500 tons of heavy water.

Some of it will come from the U.S., which has been Canada's chief source of supply, but there is not enough to fill the requirement. Heavy water from Russia will help. □

Tunnel pact

An Ontario Hydro contract valued at approximately \$5 million has been awarded to Foundation General Engineering Construction, a division of Foundation Company Canada Limited, of Toronto, for the cooling water intake tunnel at the Bruce nuclear power station.

The work will take about 18 months to complete.

Involved in the contract is not only the horizontal tunnel work but the sinking of vertical shafts into Lake Huron so that water can be drawn down from the lake and delivered up to the station's forebay. A lake-bottom structure over the intake shaft will also be placed by Foundation.

The tunnel will stretch 2,000 feet out under the lake and will be 140 feet below the bottom at the intake end and 180 feet below ground level at the forebay. With a diameter of 24 feet, it

will be hypothetically large enough to accommodate two lanes of traffic.

Tunnel and shafts will be lined with concrete. Close to 120,000 tons of rock and overburden will be removed and disposed of at the Bruce site. Dolomite, limestone and coral limestone are found under the lake, with limestone predominating. When the station's four units go into full operation in the late 1970's, water will flow through the tunnel at a rate of 2,300,000 gallons a minute.

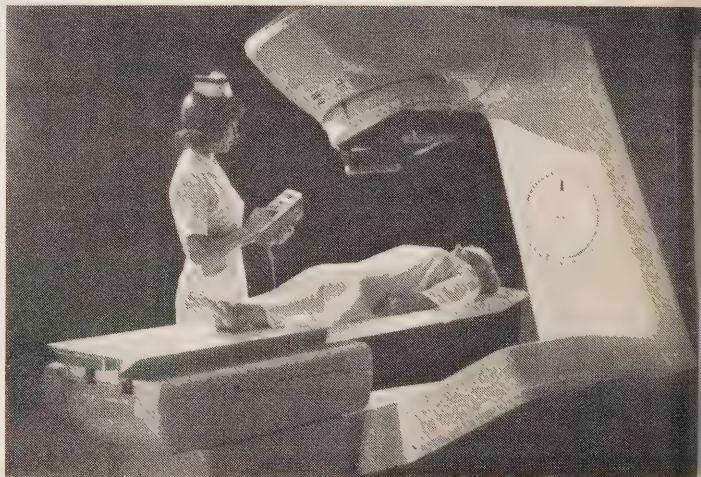
Science seminar

Ontario secondary school science teachers will be given insight into the nuclear industry at a seminar in Toronto on March 4.

The meeting is being arranged by the Canadian Nuclear Association and will include a plenary session in the morning and workshops in the afternoon.

Among those participating will be Dr. A. M. Markovits, Dr. George Pon, both of Atomic Energy of Canada Limited, and Larry Higgins, Ontario Hydro economist. The meeting will be held at the Ontario Institute for Studies in Education, Toronto.

Computerized cancer care



Radiation treatment

World-wide attention has been focussed on a Canadian-design radiation therapy machine built to help doctors employ computerization and automation in the radiation treatment of cancer.

Developed by Atomic Energy of Canada Limited's commercial products group, the Theratron 780 and its companion Simulator made their debut in Chicago at the annual meeting of the Radiation Society of North America.

Introduction of the electronic computer enables the doctor to develop and use treatment techniques which were previously difficult or cumbersome because of the time and detail involved. Previous attempts at computerization have always been conducted with conventional equipment that has undergone modification. This has imposed limitations on the state of the art and it is for this reason that AECL designed the Theratron 780 — a machine capable of accepting the speed and precision of electronic computers.

The 780 is a substantially more accurate machine than any yet built. Accuracy means the radiation therapy machine rotates around the patient with such precision that the centre of the therapeutic beam will not wander as it strikes the tumour. In the case of the 780, this accuracy is one millimeter — about the thickness of the tip of a ballpoint pen.

In radiotherapy, the total radiation dose has to be spread over as many as 26 treatments, and usually the same beam directed

necessary adjustments and settings to the machine and treatment for each individual treatment. This phase, when done manually, often takes 10 minutes or more for each treatment. With the 780, this can now be done in seconds and without the possibility of human error.

The computer has the ability to record all pertinent data about each patient and the various treatments and the information can be recalled instantly at any time.

CECL's new cancer therapy equipment is the result of 20 years of engineering experience and collaboration with leading radio-therapists and cancer clinics around the world. □

Big step in DC

Progress in testing of a 150,000-volt solid state converter valve has put Canada well on the road to developing a capability in the field of high-voltage DC transmission.

The device was designed and built by Westinghouse Canada Limited under a development program jointly financed by Westinghouse and the federal government's Department of Industry, Trade and Commerce.

Scientists and engineers at the Hydro-Quebec Institute of Research assisted in theoretical and experimental investigations leading to the design of the valve. Institute testing facilities were used for performance testing.

The valve's function is to convert alternating current from a generating station to direct current for long-distance transmission, then change it back to AC at the receiving end of the line. Beyond certain distances, high-voltage DC transmission offers attractive advantages over AC systems now in general use throughout the world. □

Safety plus

Suggestion that less restrictive safety requirements for nuclear power stations be explored has come from Dr. G. C. Laurence, former president of the Atomic Energy Control Board of Canada. Dr. Laurence, in an address to the Niagara-Finger Lakes Division of the American Nuclear Society at Sheridan Park, said that safety requirements about nuclear disasters were more credible 15 years ago when less was known about the hazards.

He described the nuclear industry as much less dangerous for the general public than many other circumstances of daily life, such as highway travel, sport and misadventure in the home. The development of better, and more suitable, instruments and components has led to improvements in reactor safety, but there is still room for improvement in the manner in which they are used. Many of the nuclear power stations operating 10 years from now will be designed in the next few years, Dr. Laurence said. Hence, the safety requirements imposed on design today should be suitable for 1982.

On the other hand, we do not need yet to formulate safety requirements for nuclear power stations that will be designed for 1982. Technical progress in reactor design cannot be predicted that far ahead. It is absurd to impose on the nuclear industry of the seventies restrictions that may not be necessary in 20 years later."

In-service inspection procedures at the Ginna nuclear power plant and Nine Mile Point nuclear plant (both in New York State) were discussed by John Arthur, Rochester Gas and Electric, and John Smith, of Niagara Mohawk.

Mr. A. B. Mitchell, of Ontario Hydro, discussed the application of in-service inspection at NPD and pre-service inspection at NPD while G. G. Legg, of Atomic Energy of Canada Limited, discussed the objectives of designers for in-service inspection of CANDU reactors. □

New AGM



Milan Nastich



Neil McMurtrie



Harold Banks

Ontario Hydro's property director, Milan Nastich, has been appointed assistant general manager—finance. He replaces E. Harold Banks, who has retired because of ill-health.

Mr. Banks had been with Hydro since 1947 and made a significant contribution to the organization during a period of rapid expansion.

Mr. Nastich joined Hydro in 1949. He has served as comptroller, manager of budget and financial reporting, director of computing services, systems officer in the management services division and director of property.

Mr. Nastich is succeeded in the property portfolio by Neil J. McMurtrie, who joined Ontario Hydro in 1946 and has held a number of positions in the transmission and distribution division. He was transferred to the property division last year as manager of property acquisition. □

Where the money goes

Bowmanville PUC held its first "open house" recently and its aim was simple — to let people know what they get for their money.

When it was all over, the local weekly newspaper, The Canadian Statesman, said: "There can be little doubt it achieved that goal. Through the expert use of displays, charts, diagrams and a little help from friends (Ontario Hydro and Oshawa PUC), the local commission presented an excellent insight into its many operations.

"For most visitors it was pure, wide-eyed discovery . . . and a new appreciation for what their utility bills actually buy.

"The PUC manager (Morley Watson) and staff are to be commended for the hard work they put into their project . . . and for something that is even more precious, their concern and interest in making the utilities more public. Would that other public bodies had the same attitude," The Statesman said. □

Meter monitor

Strathroy PUC has purchased the first 10 of a new metering device that has just hit the market — and they'll save the utility plenty in meter-reading costs, says manager Al Lawson.

Called a remote reading register, the device is a small box which is attached to the outside of a house, hooked up to the main meter inside, and permits the meterman to take his reading without ever entering the customer's home.

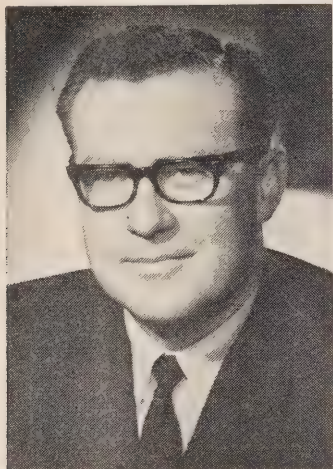
There's one for water meters, too, and the Strathroy utility is installing both.

Mr. Lawson points out that the remote reader eliminates returning to homes where no one is in, eliminates manhours wasted on getting into basements where access is difficult and cuts down on dog bites.

Another advantage, Mr. Lawson says, is the simplicity of in-

stallation. Service is interrupted for only a few minutes while two small wires are attached to the main meter. In the case of moving the main meter outside, service may be interrupted up to half-a-day. □

Trade centre



Richard Horkins

An international trade centre is needed in central Toronto to compete for conventions and trade shows with Montreal's \$75 million Place Bonaventure, says Richard R. Horkins, recently elected president of the Metropolitan Toronto Industrial Commission.

The 45-year-old bachelor chairman of Toronto Hydro has stated that he will seek the support of all agencies and organizations in the business community to have such a trade centre built.

However, Mr. Horkins added, the centre would have to be

supported by a new airport, close to Toronto, and by adequate transportation links between the city core and the airport.

"Place Bonaventure may not have shown a direct dollars-and-cents success," Mr. Horkins says, "but you must think of the money spent in the community by visitors and the exposure of the community to businessmen."

Mr. Horkins suggested the new centre could form part of the proposed new Metro Centre development. "Some such facilities are planned, but not on the scale needed," he added. □

Coins for the treasurer



Celebrating 30 years

Brampton Hydro paid tribute to its secretary-treasurer, Mrs. C. A. (Betty) Plant, at a dinner to commemorate 30 years' service to the utility.

Chairman Elmore Archdekin, with help from his brother, Mayor James Archdekin (right), turned over a set of Canadian coins to Mrs. Plant on behalf of the commission. Mrs. Plant joined Brampton Hydro in 1941 as an office clerk and has been secretary-treasurer for 20 years. □

Pat on the back for CANDU

Canadian nuclear reactors came in for some strong support recently from Dr. Lew Kowarski, senior physicist of CERN, European organization for nuclear research.

In a visit to Chalk River, Dr. Kowarski described the Canadian reactor system, featuring heavy water and natural uranium, as the world's most promising. "The Canadian effort is extremely important for the future of nuclear energy and should be continued," he said.

Dr. Kowarski said fast breeders would be more complicated than present-day reactors, and thermonuclear reactors would be more complicated still.

"For the time being, the world is cheerfully rushing down the greased slope; it follows the U.S. technique of generating nuclear power without having the U.S. reasons for it. But the Canadian way still seems to be the safest for the environment," Kowarski said.

Iran pact

Canada and Iran have signed an agreement to co-operate on peaceful uses of nuclear power. The agreement was described in Ottawa as a useful first step in selling Canada's nuclear technology to Iran.

The agreement permits doors to open for exchanges of information and services. There is some speculation that a \$90 million power station may materialize from the pact.

municipal briefs

One of the longest strikes in Ontario municipal utility history ended recently when 13 Georgetown Hydro employees returned to work. They had been on strike 22 weeks. The strikers' members of the International Brotherhood of Electrical Workers Local 1766. They accepted a two-year contract raising basic wage from \$4.15 to \$5.15 an hour in two steps over the life of the agreement, which expires on April 1, 1973. During the strike, services to 6,000 customers were maintained by management personnel.

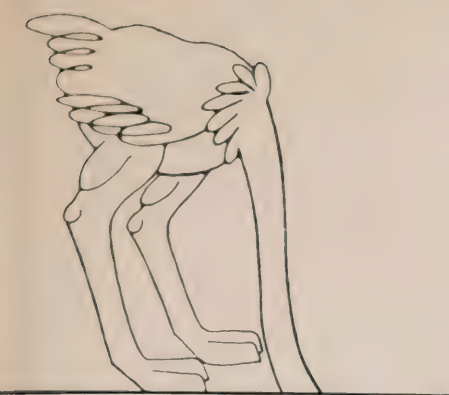
The AMEU has selected Belleville as the site for its 1973 equipment show. About 200 exhibitors are expected to participate in the May event, which will feature demonstrations of equipment used in underground distribution, street lighting systems and linework. The show is likely to attract 2,000 visitors from across Canada. The last show was held in 1970 at Stratford.

A long utility career came to a close recently when Helen B. LaRue, office supervisor for Sarnia Hydro, retired. She had been employed by the utility for 46 years and was office supervisor for most of that period. Miss Laurie is succeeded by Ray Forster, who assumes the duties of office manager in addition to computer department activities.

It was good news for Brantford PUC customers when outgoing chairman Jack Wratten Jr. submitted his summary of committee activities over the past year. Mr. Wratten said completion of the city's street lighting renewal program is expected this spring, nearly two years ahead of schedule — and the new lighting will cost \$100,000 less than originally expected.

A wide area of Waterloo was without power recently, and said Kitchener PUC was to blame. A Kitchener PUC truck reportedly knocked over a Waterloo PUC hydro pole after a malfunction involving a car.

J. T. (Johnny) Cookson, an Ontario Hydro municipal accountant for 14 years, has been named supervising municipal accountant in the Northeastern Region. He succeeds J. H. Silverthorn, transferred to Hydro's internal audit department in Toronto.



Don Wright sees it

me was when an eclipse of the sun or moon was an awesome event which could be likened only to the heady excitement of a Sunday school picnic or a trip to Centre Island with 25 cents to be spent on the likes of candied apples and skimo pies.

We recall these heavenly performances with great nostalgia. Pieces of broken beer bottles were considered ideal for peering at these solar shenanigans without damage to the eyeballs, and the citizenry were to be seen gathering on the streets gazing skyward in some awe. We'll wager, though, that few youngsters were on hand to witness the last eclipse of the moon which occurred in these regions at 5.37 a.m. on January 30. Space explorers are probably to blame.

Not only have these birds ended all sorts of intriguing theories, but they've put a big dent in the ukulele business. Mooning 'neath the moon in June is a thing of the past. One can't get too romantic over a heavenly body that's been used as a golf course and drag strip. Lunar lunacy still lingers in some parts of the world, though, as those reports from Cambodia make clear. Caught by surprise by the January eclipse, the Cambodian army opened fire at what they thought was a monster devouring the moon. So enthusiastic was the fusillade that the supply of ammunition was almost exhausted and the country left almost defenseless.

We don't know just how far Cambodians will shoot, but future astronauts might be wise to bring plenty of pumpernickel on their next trip to the moon. That dragstrip in the sky may have been turned into a Swiss cheese.

There is no place for superstition in this enlightened age. Civilized armies know better than to waste good taxpayers' bullets. Guns were made for shooting people — not mythical moon monsters.

Mind you, the Cambodian action probably stemmed from the long history of superstition with regard to the sun and the moon. Consider the following warning of a total eclipse which was carried in a German newspaper in 1699:

"His Highness, having been informed that on Wednesday morning next at ten o'clock a very dangerous eclipse will take place, orders that on the day previous, and a few days afterwards, all cattle be kept housed, and to this end ample fodder be provided; the doors and windows of the stalls to be carefully secured, the drinking wells to be covered up, the cellars and garrets guarded so that the bad atmosphere may not obtain lodgment, and thus produce infection, because such eclipses frequently occasion whooping cough, epilepsy, paralysis, fever and other diseases, against which every precaution should be observed."

No wonder the Cambodians got the wind up — sounds like a Pollution Probe description of the Hearn plant.

■ The labor movement took a big step forward in the U.S. recently when inmates of a prison in New York State announced they were forming a union. They have been accepted as an affiliate by the Distributive Workers of America.

Never could figure out the logic in union affiliation. In this case, the iron workers or even the stone masons would seem a better choice.

Not surprisingly, the new union is anxious to start negotiations on wages, housing and working conditions. Seems like the lads in this particular hoosegow have hung up their sledge hammers and turned away from the production of small rocks from big ones. Instead, they're turning out such dainty items as baby bibs and bathrobes.

But the union will have its work cut out. Present wages are 35 cents per day — hardly enough to attract the best class of workers. On the other hand, portal-to-portal pay is not an issue and fringe benefits such as pensions, vacations and sick leave are not on the bargaining agenda. And the members aren't in the least afraid that management might resort to their big stick — the lock-out.

■ We've had a suspicion for some time now that one of the fastest growing pollution problems is the over-supply of amateur and professional ecologists. Multiplying at a rate which threatens to relegate the mink and the rabbit to second and third place in the reproduction championship, these fellows will soon be so numerous as to threaten the existence of some of our rarest species of flora and fauna.

Lovers of solitude such as the double-tufted nib-picker are not likely to survive long in eyeball-to-eyeball confrontation with ecologists intent upon holding their hands and taking their temperature. And how many exotic plants like the sticky-zippered fly-catcher will stand up under the growing herds of flower fanciers and nature nuts?

Already, the pelicans are up in arms. Heavy-footed environmentalists are among the reasons given for the recent severe decline in the birth rate of these basket-beaked birds on Anacapa Island, off the coast of Southern California. Biologists contend that the thin-shelled eggs laid by these graceful creatures could have been caused "by researchers trampling through the birds' nesting area."

Right here in Ontario, these fellows are to be found any time of the day or night tramping up and down country lanes, over marshes and along established and potential power line rights-of-way. Who knows how many hydro-headed kilowatt whoopers have been disturbed and discouraged in their mating habitats in the lush grass 'neath the transmission lines.

Among the recent ecological bogeymen exposed by environmental vigilantes is a dastardly plot by government authorities to secretly divert massive quantities of sparkling fresh Northern Ontario water to the United States.

This is, indeed, an infamous scheme and one which is bound to challenge the ingenuity of all involved. Making off with a river or even a small lake in the dead of night, and without raising an eyebrow, will take some doing.

Even so, the plot pales to insignificance when compared to the one we have uncovered personally and without any assistance from the protest groups. These grievous machinations involve the highest official in La Belle Province and the leader of the Federal opposition in Ottawa.

We got our clue to the conniving of these strange bedfellows in a report by two marine scientists. They say that the proposed James Bay hydro-electric development may very well change the climate of all Eastern Canada, making our winters both longer and colder.

What does cold weather bring to mind? Long underwear, that's what . . . and who is Canada's Mr. Big in the long-john business? We will leave it to our readers to form a group capable of dealing with the great ballbriggan scandal.



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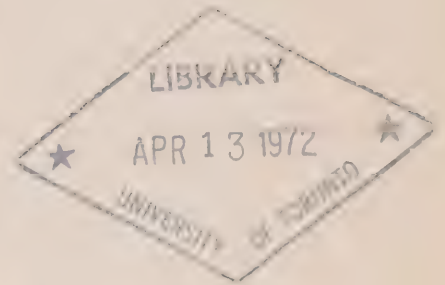
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ST OF AGES • BRINGING 'EM BACK ALIVE • TILTING AT WINDMILLS • RETURN OF EQUITY UNDER FIRE

ontario hydro news

march/1972





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the cover

A photographic potpourri sets the style for this month's magazine, which features articles on fly ash, driver safety, electrical growth rates and plain business meetings.

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Problem with underground

Ten years ago, the pylons supporting Hydro's high-voltage transmission lines were regarded as symbols of progress. Today, these same towers are as often likened to monsters intent only upon ravaging the beautiful countryside.

The transmission lines haven't changed — except for the better where appearance is concerned. The change is in public attitude and values. Power lines do have an impact on the environment and the onus is on Hydro to explore every avenue to minimize adverse effects in moving its vital power to market.

Inevitably, though, people will be disaccommodated and it is not easy for those who are directly affected to view new developments in terms of what's best for the majority. While accepting the need for transmission lines, the natural reaction is to suggest that the best route lies somewhere else.

Failing this, the appeal is to have Hydro bury its lines. This has often been urged in connection with the rights-of-way being acquired for the 500-kv network in Southern Ontario and considerable misunderstanding seems to exist as to cost and technological limitations.

What is so difficult about digging a trench and laying a few cables? To the layman this is a logical question, particularly when the municipalities and Ontario Hydro are making such good progress in burying distribution lines in new subdivisions and elsewhere.

The difference is a matter of voltage. For example, a 500-kv ac cable of conventional design and over 15 miles in length would not be able to deliver any load current at the end. This is due to a phenomenon known as "charging current," and while equipment is available to overcome this problem it is very costly and would require large above-ground installations at intervals along the line.

Heat generated in underground cable must be dissipated or the insulation will be destroyed. Both the cable's electrical insulation and the earth effectively prevent heat transfers and this necessitates limiting the current to a value considerably below that of an equivalent overhead circuit of the same voltage.

Theoretically feasible, 500-kv cables are still in the developmental stage. Except for very short experimental installations, no utility anywhere has used underground cable at this voltage.

Another important consideration is reliability. This is generally lower for underground circuits at any voltage. They are subject to corrosion and vulnerable to damage from excavating equipment. A failure in an underground circuit can take weeks to repair.

Reliability is a paramount requirement for the 500-kv grid which will be the backbone of the Hydro system, moving power in bulk to major load centres.

The consensus among transmission line engineers here and in other countries seems to be that progress is being made, but the undergrounding of high-voltage transmission on a large scale will not be technologically possible nor economically feasible for many years.

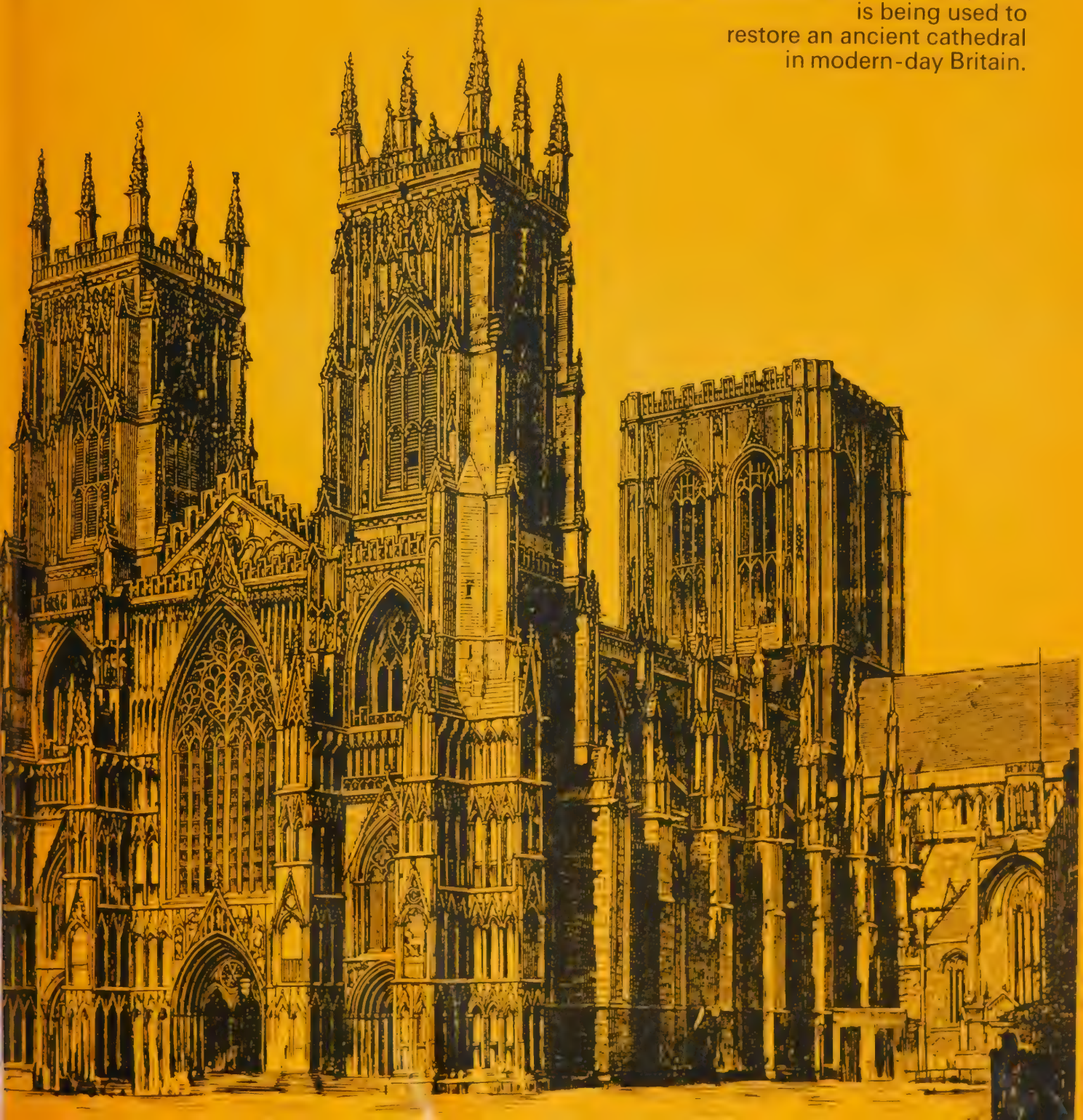
In the next six years, Hydro expects to spend at least \$1.3 billion on the construction of 230-kv and 500-kv transmission lines. The comparable cost for underground, if it were feasible, would be about \$6 billion.

To put that figure into perspective, Hydro's present assets, including all generating stations, transmission lines, transformer stations and distribution facilities, total only 5.2 billion.

Yes, Hydro would like to go underground with its new high-voltage lines and it will commence to do so when the state of the art reaches a point where it can proceed with such a program in the best interests of the people it serves. □

Dust of Ages

The Romans had a word for it. Pozzolana, they called it. And centuries later pozzolana's modern equivalent, fly ash, is being used to restore an ancient cathedral in modern-day Britain.



What does a centuries-old English cathedral have in common with a modern coal-burning power station? The answer is a fine, grey powder which, according to American astronauts, bears a striking resemblance to moon dust. Its name is fly ash.

Consultants engaged in a \$5 million restoration of the medieval York Minster found the material an ideal grout for the cathedral's crumbling stonework. It was fed under pressure to fill the tiny holes and cracks that developed in the original masonry because of settlement.

Composed mainly of silica, alumina and iron oxide, this residue from the burning of pulverized coal is one of a number of materials having pozzolanic, or binding, properties when combined with lime in the presence of moisture. Volcanic ash is very similar. The ancient Romans knew of its cementing abilities and used it to build the Colosseum.

Fly ash has long been a disposal problem for the power industry. In the U.S. alone, electric utilities will produce an estimated 29 million tons a year by 1975. Most of this will have to be dumped, and suitable sites are becoming increasingly scarce.

Providing at least a partial solution to this dilemma in Ontario is a \$1.5 million process plant which was commissioned this month a short distance from the 2,400,000-kilowatt Lakeview generating station on the western outskirts of Metropolitan Toronto.

The plant sinters fly ash into aggregate to replace sand and gravel in such pre-cast products as concrete blocks, slabs and panels as well as lightweight concrete for multi-storey buildings. Another product is refined fly ash, which can replace up to 30 per cent of the cement used in making concrete.

"It certainly represents a major breakthrough in our search for an economic use for fly ash," says Jack Marsh, the plant superintendent.

Mr. Marsh says the plant will handle 200,000 tons of fly ash a year, all of it from the Lakeview station. Up to now, Hydro has been paying anything from 50c. to \$2.50 a ton to have it hauled away and dumped as landfill.

Ash arrives from the generating station in hermetically-sealed tanker trucks which receive and discharge their cargo through flexible pipes. The fly ash process plant has three main sections, for beneficiation, sintering and the production of aggregate.

In the beneficiation section, carbon and iron are removed from the fly ash through air separation, heating and magnetic screening. Because of the type of coal

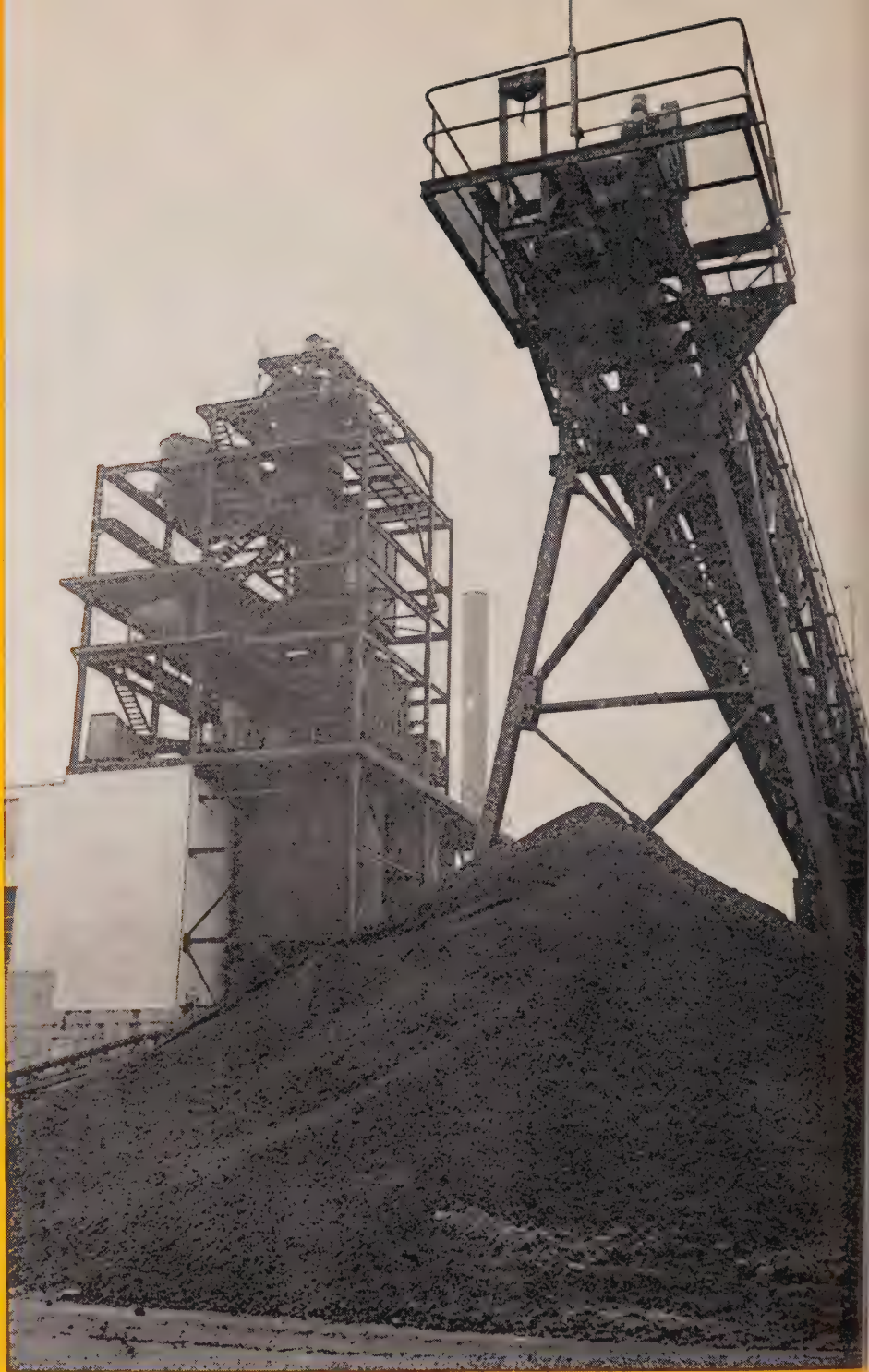
used, the fly ash produced in Ontario's power stations has a relatively high carbon and iron content, making it less acceptable as a raw material than fly ash in some parts of the U.S. and Europe. The beneficiation process removes this disadvantage.

After beneficiation, the material is fed into a furnace for sintering into pellets which are later crushed and screened into various sizes of lightweight concrete aggregate.

The Lakeview fly ash process plant is owned and operated by Ontario Hydro.

Responsibility for marketing its products falls on a private company, Enercon Limited. Once the plant is in full operation it will run 24 hours a day, seven days a week. Between 26 and 30 people will be employed there.

Ontario Hydro first used fly ash concrete on a trial basis in one block of the dam at the Otto Holden station on the Ottawa River. That was in 1949. Repeated comparisons of the test section with the concrete used in the remainder of the dam have indicated no deterioration, even





Plant superintendent Jack Marsh examines sintered fly ash pellets. These pellets were produced before the beneficiation plant went into production, and still have a high carbon and sulfur content. Stacking conveyor which transports pellets from the sintering plant is shown on left.

waterline where weathering is most severe.

Since then, Hydro has used fly ash concrete in a number of major power stations including the St. Lawrence and Mountain View dams and such thermal-electric plants as Lakeview, Lambton, Nanticoke and the nuclear station at Pickering, east of Toronto. At Pickering, fly ash has reduced the amount of cement in the 400,000 yards of concrete by about 20 per cent.

Free from its role as an additive in concrete, fly ash has found use as landfill in a number of recreational projects. Thanks to fly ash trucked from Lakeview, an eight-acre splash of green with swings, baseball-diamond and soccer pitch has replaced the open sore of a Mississauga slag pit.

Now known as Oakridge Park, the old pit was filled to a depth of 25 feet with fly ash, which was then compacted, capped with top soil and sodded.

An even more imaginative project is a dumping experiment involving the J. Clark Keith generating station in Windsor. Thousands of tons of fly ash were trucked to a Sandwich West township site and bulldozed at Hydro's expense into a 70-foot ski hill. Hydro also covered the hill with topsoil and upgraded a road to the site.

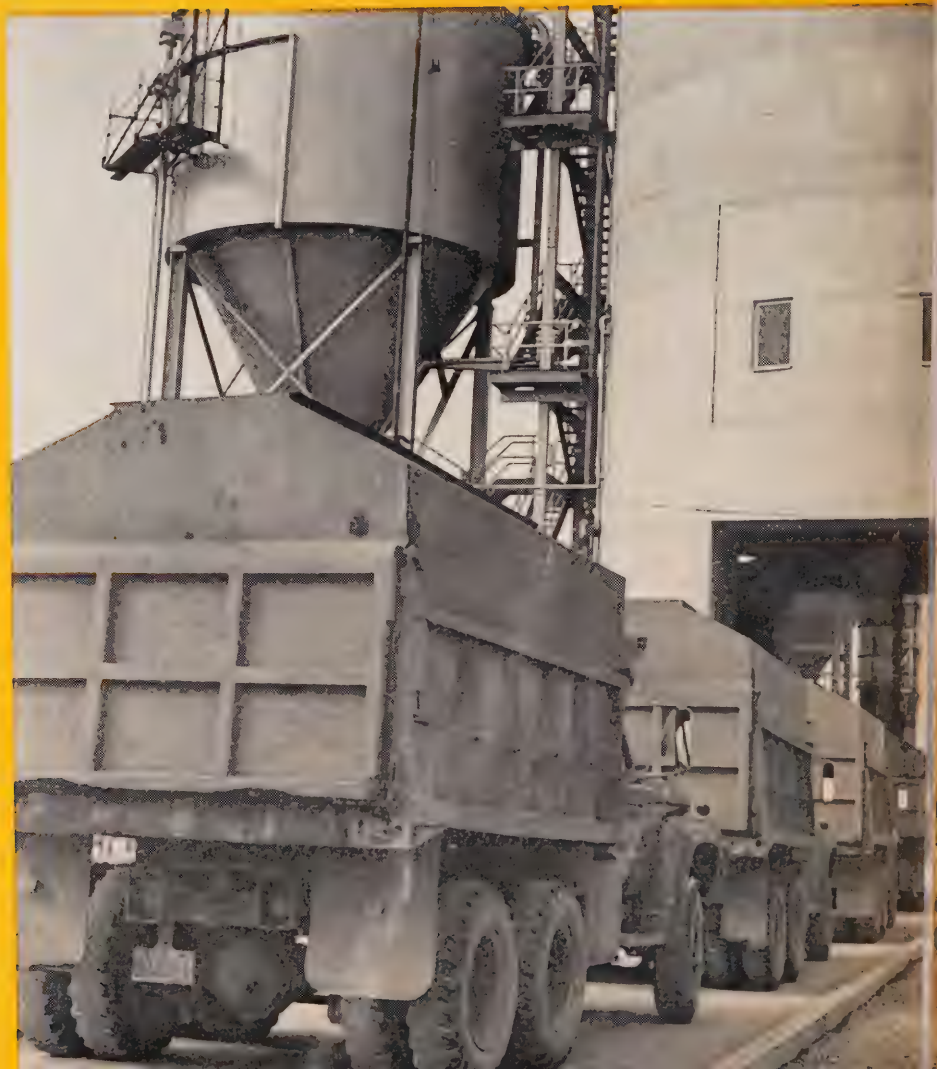
Jack Menard, chairman of the township's parks and recreation committee, said it would have "cost us a fortune to build a hill like that."

The township didn't stop there. It took advantage of the federal government's local initiative program and obtained a grant of more than \$24,000 to plant 720 trees, create nature trails and build picnic tables, log fences and a shelter. A small lake will be created and part of the 12-acre site may eventually be used as an overnight camping area.

Commercial exploitation of fly ash is still very much in its infancy, though. Experiments by the U.S. Bureau of Mines have shown that fly ash, injected either dry or in a water slurry through boreholes, is effective and economical for both the filling of mine voids to prevent subsidence and to control or extinguish fires in abandoned mines. But the amount of



Ideally suited for landfill projects, fly ash can transform open sores like the one above into valuable parks and recreation areas. Below, trucks line up beneath the fly ash hoppers at Lakeview generating station.





material needed for such projects does not constitute a major use.

ash as a mineral filler in asphalt pavement has been developed in several states, notably Michigan, while Britain's Central Electricity Generating Board has been able to dispose of a great deal of pulverized fuel ash, as it's known there, by using it as fill and to build embankments for the U.K.'s extensive motorway system.

In the mid-sixties, agronomists at the University of Massachusetts succeeded in growing certain types of grass in fly ash by the simple procedure of adding fertilizer to supply nitrogen and potassium. Analysis of fly ash samples from the Western Massachusetts Electric Company revealed very large percentages of magnesium, calcium, phosphorus, iron and aluminum.

Further trials showed that 5 per cent fly ash mixed with local soils provided a marked decrease in washouts and added typically deficient nutrients, with the exception of nitrogen and potassium.

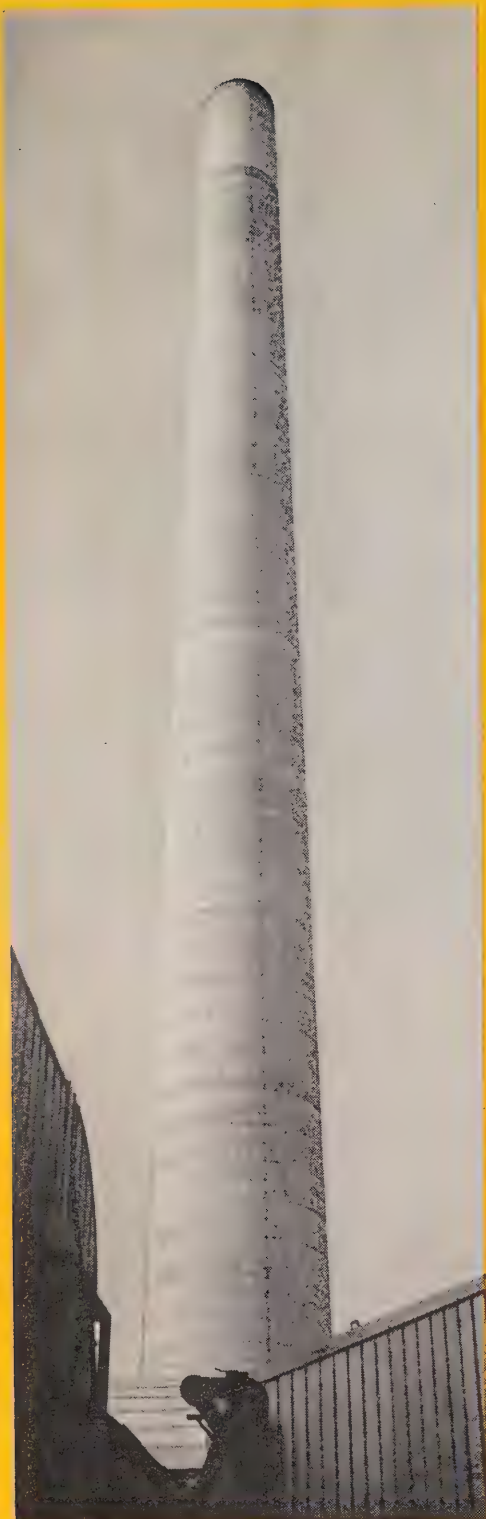
Perhaps the most bizarre claim about the properties of fly ash, though, comes from two University of Notre Dame environmental engineers who believe it can help save dying lakes. Working under a grant from the Federal Water Pollution Control Administration, Dr. Mark Tenney and Dr. Wayne Echelberger say their fly ash experiments in a eutrophic 148-acre lake near Cassopolis, Michigan, seem to be successful in filtering phosphorus from the water. The lake has no natural flushing action and has "one of the highest

phosphorus concentrations of any lake in the country," they say.

The researchers enclosed two columns of lake water inside plastic tubes, which were anchored on the bottom mud and supported on the surface with floats. One of the columns was left untouched; the other was treated with fly ash. Within six hours there was a marked improvement in the treated water. Within 24 hours it was almost crystal clear.

According to Tenney and Echelberger, the fly ash had filtered out the three major causes of eutrophication — inorganic and organic phosphates and carbonaceous organic wastes.

"You don't just use any old fly ash," said Tenney. "The worse the better, because of the carbon content." □



Electrostatic precipitators are designed to remove 99.5 per cent of the fly ash from the flue gases at Ontario Hydro's newest coal-fired plant before they reach the 650-foot stack. At Nanticoke, right, fly ash is sluiced to a disposal lagoon through several miles of piping.



Nanticoke has ash lagoon

The problem of fly ash disposal still exists, and will for some time to come.

But at Ontario Hydro's Nanticoke generating station, on the north shore of Lake Erie eight miles east of Port Dover, a unique system has been designed to handle all the fly ash expected to be produced over the plant's 30-year life.

Costing about \$8.3 million, the system incorporates a 185-acre wet ash lagoon for receiving ash sluiced from the boilers and waste water from the plant's water treatment system. Water from the lagoon is recirculated back to the station for reuse in the ash sluicing process.

Ash collected from the station's electrostatic precipitators is piped to the lagoon in eight separate lines of piping, averaging 4,000 feet in length. The closed-cycle system for moving about 135 tons of ash an hour is one of the most up-to-date and cleanest methods of fly ash disposal in the world.

hydro's UNDERCOVER OVERCOVER men

Angus Williamson and Art Penny, of the protective coatings group, examine a piece of carpet which has been subjected to a flammability test.



by Jim Dunn

"Try this new water-proofing substance on canvas," the salesman urged. "It's the best on the market."

Taking the man at his word, Angus Williamson and his protective coatings group at Ontario Hydro's Research Laboratory decided to test it, only to find that water poured through treated canvas as it would through a sieve.

Undaunted, the salesman returned to the Kipling Avenue centre in Toronto, explaining that he had been misunderstood, that the product was actually a protective coating for polished brass.

This time, before the salesman left, Mr. Williamson acquired some polished brass, applied the substance and watched as almost immediately the metal began to corrode. The salesman departed, never again to return.

Somewhere in the story there's a message, and it points out why Hydro has a protective coatings group to test the products it uses.

Tucked away in a corner of the research centre's third floor, the group's size belies its importance. The six-man team goes about its work quietly and unobtrusively. But its findings may contribute a great deal to the successful operation of the province's huge multi-million-dollar generating stations.

Currently, the group is investigating the properties of a wide range of high-performance coatings to determine resistance to demineralized water, chemicals and radiation. These coatings will be used as liners in water treatment tanks, neutralizing sumps and spent fuel bays at nuclear plants including the Bruce station on Lake Huron. The work will take up to two years to complete. Since an unsuitable recommendation could result in a temporary shutdown of the plant, perhaps because of lining failure, this is no small responsibility.

Other activities undertaken by the group include continuing studies into the performance of coatings on steel and concrete panels placed on underwater test racks, research into the relationship between the performance of a coating and the amount of surface preparation required, and investigations into elastomeric joint sealants. Elastomeric sealants are used to caulk joints and may stretch up to three times their size, returning to their original dimensions once the stress is removed.

While of a somewhat less critical nature, the development last year of a grey stain for wooden poles was nonetheless significant from an aesthetic point of view. The research also proved to be of great value to the province's municipal electric utilities.

The stain greatly improves the appearance of wooden subtransmission poles and, from a distance, it is impossible to differentiate between them and their concrete counterparts.

The stain won't flake or peel, can be applied to wet wood, is fireproof and extremely durable. Treated poles are being used extensively in Toronto and Mississauga.

Not all the group's work is of such a technical nature, however. Everything from the bursting strength of toilet paper to the cleaning power of detergents is tested . . . and these are areas in which employees' personal preferences are important.

"While our job is to discover or develop products that will do the best job for Hydro," Mr. Williamson says, "it is equally important to recommend goods that meet with the greatest possible employee acceptance. No matter what is recommended, though, someone will find something wrong with it." Mr. Williamson recalls one detergent that brought a remarkable number of compliments for the medicinal effects it had on the skin. Yet, another employee complained it caused dermatitis.

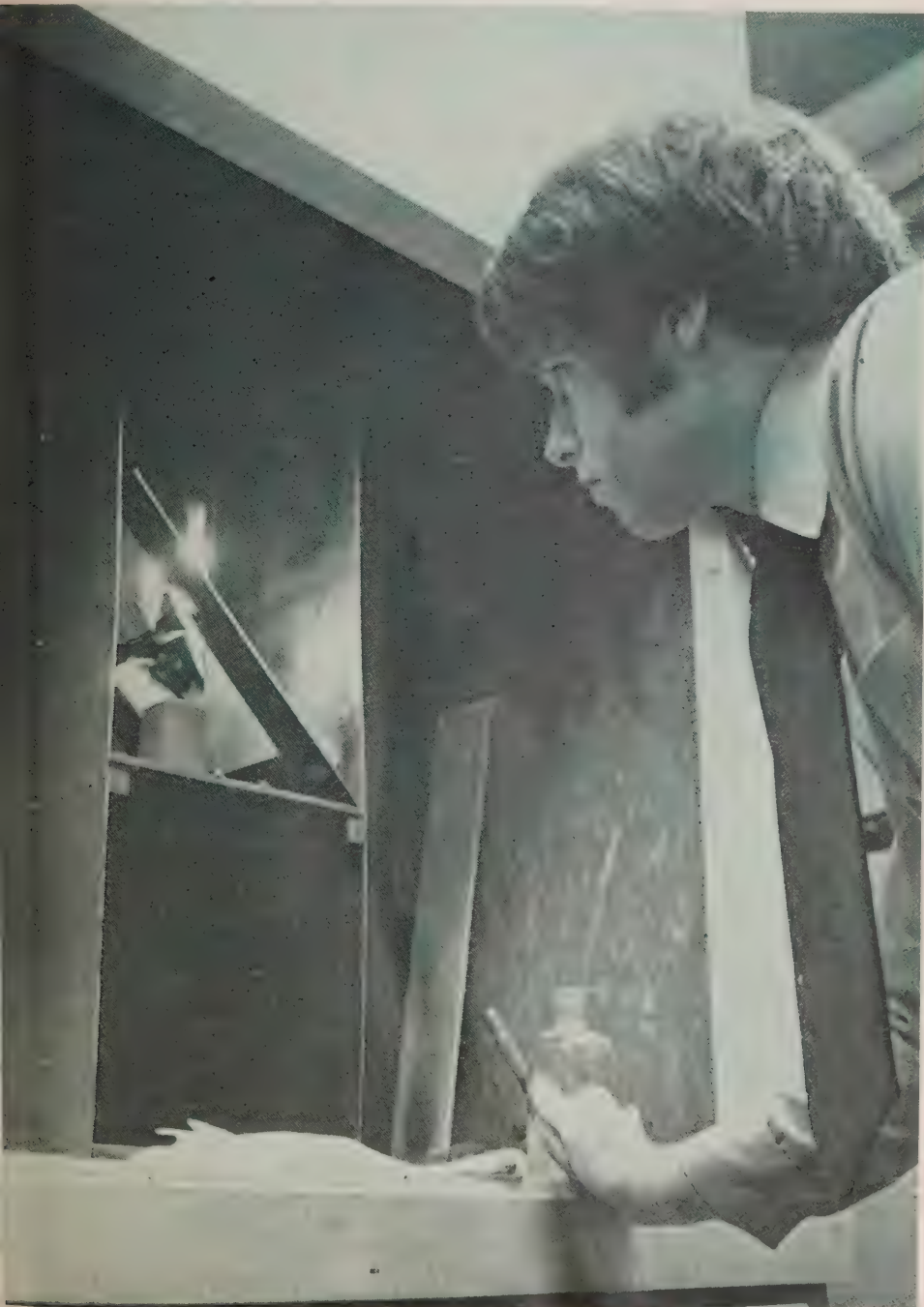
The list of products that pass through the labs is a long one. All soaps and cleaners used by Hydro are examined here.



...other things, how will they clean, how much is required to perform specific tasks and also what their chemical makeup is. Coatings and vehicle undercoatings are also investigated, particularly new ones coming on the market.

One time the workload consisted of testing roofing materials and coatings, and even today these take up about 70 per cent of the time. Roofing materials, paints, finishes and sidings undergo severe testing, including anywhere from 250 to 500 hours in a weatherometer – a

Rick Cabanus inserts painted test panels into the weatherometer, which simulates conditions of weathering over an accelerated time period. Below, Rick Pascoe conducts a flammability test on protective clothing fabric.



cylindrical metal container that can simulate, in an accelerated fashion, weather conditions such as heat, sunshine and humidity. Exposure in the weatherometer for just 500 hours is equivalent to one year of weathering in the Toronto area.

The remaining 30 per cent of the lab's time is at present devoted largely to testing building maintenance products and textiles, mainly because of the switch to office landscaping in so many of Hydro's buildings. However, the staff also becomes involved with protective clothing and safety equipment.

In conjunction with this gradual shift in

emphasis, the group is testing everything from carpets and draperies to artificial turf.

Draperies are examined for stain and wrinkle resistance, flammability and sound-absorption qualities. Special equipment is used to generate sound waves, bounce them off a curtain and measure their intensity. The most effective type of drape in this regard was found to be the loose, mesh variety.

Carpets are tested for many of the same qualities – durability, stain-resistance and flammability. To test durability, small samples are placed on a machine containing rollers which move over the material. Some 2,000 revolutions are comparable to about 10 years of wear in a heavily travelled area such as a foyer.

The lab has also had to look more closely at the maintenance of landscaped offices. So one of these days research technicians will be observed pushing vacuum cleaners around the lab to determine the most efficient method of using them. The strength of the vacuum in various industrial machines, as well as the efficiency of their brushes, will also be tested. For some time, though, the group has been testing ordinary brooms and brushes for strength, fibre density and cleaning capabilities.

Despite all this work, problems are not eliminated completely, as a recent complaint from one of the Ontario Hydro regions demonstrates. Someone varnished four doors and found that, four months later, they were still sticky. Upon investigation, the group discovered that an insulating varnish had been used – and it has to be baked on.

Adding still greater variety to the group's duties is its design function, and just recently a new, less cumbersome fastener – an important safety feature – was recommended for the tool bags used by linemen.

Then, too, the "hot suits" (which have nothing to do with summer fashions) worn by employees who enter contaminated areas at nuclear stations will be redesigned to improve their protective qualities and to allow the wearer greater comfort and flexibility.

A new parka has also been designed for outdoor employees. In addition to being more economical, the jacket is lighter and more attractive. As with all clothing design, the employees involved are first canvassed for their opinions concerning the gear.

So if you're curious what the well-dressed lineman will wear next year, or the best wax to put on the car, or even the most efficient way to push a vacuum cleaner, the answer's simple.

Ask the people in protective coating.

Energy has become the villain in the environmentalist's scenario. W



When you hear the cue word, you're supposed to boo and hiss.

Tilting at windmills?

Bob Morrow

Hard to quarrel with the general idea that total energy growth should be slowed down or controlled if you project pollution and present fuel use into the future. It's a pretty nilly — questionable assumptions piled — and lump electric energy together with coal, oil and natural gas.

In one way or other, the word "energy" has become equated with electric energy. Which, it's suggested, should get its due reprimand like the villain in a silent film melodrama.

Electric energy can't claim by any means to be a knight on a white steed either, but its role in the over-all energy picture needs to be seen in perspective. Otherwise we may be like Don Quixote, tilting at windmills instead of discussing rational choices for the future.

Analysts usually seize on the fact that electric power demands double every 10 years. Then they throw in a few wrong assumptions and jump to the conclusion that the solution is to ration power or to build more generating stations and transmission lines.

"I submit the problem is one of excessive pressures for growth in consuming energy," one environmentalist said in a recent speech. The trouble is that he didn't clearly spell out what kind of energy he was talking about, nor its uses, nor where the "excessive pressures" came from. And he implied electricity was used for non-essential frills.

Let's examine who uses most of the electric power now, the reasons power demands are increasing, and where future pressures will likely originate.

Industry and commerce use about 70 per cent of the electricity generated by Ontario Hydro. Urban residential customers account for about 25 per cent of electrical consumption. Of this, by far the greatest amount is used for purposes considered essential, including home heating, lighting, water heating, cooking and laundry.

Among the essential uses of power that tend to be obscured by these broad statistical categories are farming and food production.

The oft-criticized electric toothbrush uses about three-tenths of one per cent of the average annual consumption of a municipal residential customer. A family of four can brush their teeth twice a day, 365 days a year, for a penny's worth of power — and that's off-peak power, too.

But it's important to realize that electricity represents only part of the total energy picture. Coal, oil, and natural gas are still the predominant energy sources in North

America. Electricity represents about 25 per cent of the energy market in Canada and the U.S.

What's happening, however, is a historic shift in energy use. In the past, man has gone through periods when he relied mainly on wood, then coal. Now oil and gas, which are dwindling non-renewable resources, dominate the scene. Fortunately, nuclear energy has made a timely arrival.

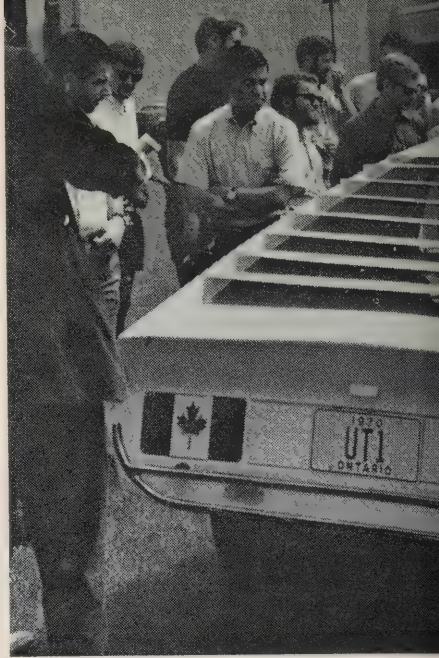
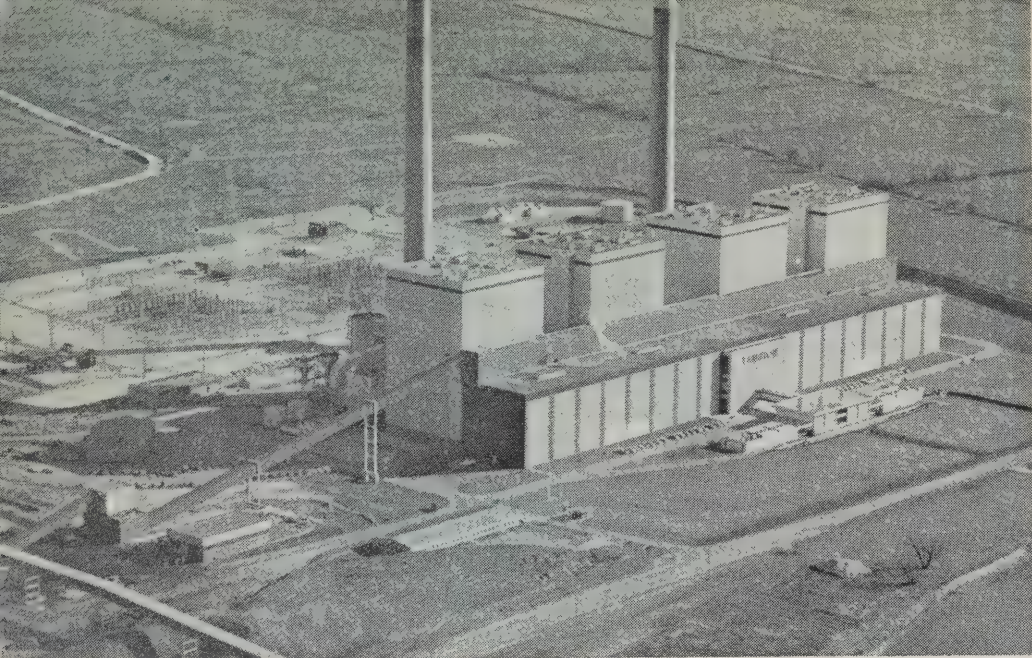
During the past 75 years, electricity has tended to displace other forms of energy because it's clean, particularly at the point of consumption, versatile and convenient. This trend, which is expected to continue, explains in part the increase in power demands.

The American Public Power Association has estimated that electric energy will supply 43 per cent of all the energy in the U.S. in 1990. Canada's National Energy Board expects the supply of electricity will increase at a rate 50 per cent greater than oil.

There are signs, too, that the tendency of electricity to displace other forms of energy will accelerate. One indicator is the anti-pollution regulations which require industry to burn low-sulphur coal and oil, or natural gas which is in short supply.

In fact, a number of industries are switching to electricity in part and, in some cases, entirely to avert pollution. Ultimately, fossil fuel shortages may well force industries to turn to other sources of energy such as nuclear-generated power.

Use of additional electric power for environmental reasons is particularly evident in U.S. industry. Eight out of 13 foundry and steel-making facilities in the Chicago area have converted to electric power and two major steel companies there are seeking an additional 200,000 kilowatts for electric furnaces and other purposes.



Bethlehem Steel Corporation's plant in Bethlehem, Pennsylvania, is installing a \$5.5 million dust collection system incorporating five 900-horsepower motors to control emissions from its electric furnaces. Metallic dust will be pelletized and then taken to the sintering plant for recycling.

And the largest U.S. chemical firm, E. I. Du Pont de Nemours and Co., has pledged to spend \$300 million over the next three years on air and water pollution control.

The demand for electrostatic precipitators to cleanse flue gases is also growing. Research-Cottrell, Inc., a large U.S. manufacturer, had a \$102 million backlog of precipitator orders in early 1971.

It's conservatively estimated that a precipitator for a large industry requires about 1,000 kilowatts. Lambton generating station, near Sarnia, requires 4,000 kilowatts to serve its eight precipitators, which are designed to remove 99.5 per cent of the fly ash from the 550-foot chimneys.

Recent changes in the pattern of fuel consumption are also pronounced in Canada. A 1971 survey conducted by Modern Power and Engineering magazine showed that 41.5 per cent of the industries contacted had changed fuels to cut down air pollution, and another 18.5 per cent proposed to make changes in their fuels. Coal has been the loser, oil has been holding its own and natural gas has been the big winner.

But electricity has also gained ground, particularly where it offers advantages in industrial and commercial applications.

An important breakthrough in electric induction heating has been the recent development of melting furnaces capable of nearly doubling power input over early types. Solid state controls permit furnace installations in unit ranges exceeding 200,000 kilowatts.

One of the first of these new installations is at Anaconda American Brass Ltd., Toronto, whose electric induction furnace has 1½ times the peak production rate of the company's other equipment. Another advantage is that the equipment prevents the costly loss of metal particles and effectively solves a pollution problem.

Some office and commercial installations are now using an advanced concept in water and space heating that conserves power, space and waste heat. The "Megatherm" system heats water in a pressure vessel to high temperature from which heat can be extracted from an exchanger for faucet water or heating coils. By proper control, it can be used as an off-peak heat storage system.

Environmental pressures are an unknown factor in projecting power demands, but we will undoubtedly require large amounts of electric energy for sewage treatment, waste disposal, recycling of materials,

transportation and urban renewal. In it would be risky to underestimate the for electricity if environmental goals to be achieved.

Most U.S. municipalities lack second sewage treatment plants, which require kilowatt-hours annually for each person. Some Canadian municipalities are in the same boat or have only primary treatment which requires about half as much electricity.

The power requirement can be illustrated by the Ashbridge's Bay sewage plant, only one served directly by Toronto Hydro, which used 64.6 million kilowatt-hours in 1970. In other words, a single sewage treatment plant of this size required a one-thousandth of Hydro's total electricity production.

Some large office buildings and industrial plants are installing high-temperature electric incinerators to process waste and control air pollution. Some of these installations require a connected load of 32 kilowatts.

A conceptual design for a total recycling plant, commissioned by the Aluminum Association, envisages a facility that takes in garbage at one end and produces saleable raw materials at the other. Designed to serve a city of 175,000 to 200,000 people, such a plant would consume nearly 10 million kilowatt-hours a year.



Electrostatic precipitators at Lambton generating station, near Sarnia, require 4,000 kilowatts of electricity while the Ashbridge's Bay sewage plant consumes about one-thousandth of Ontario Hydro's total energy production. Vast amounts of energy will be needed by the electric car, if it is ever mass-produced

recycle one ton of scrap iron or steel in an electric furnace requires 500 kilowatt-hours of power. One Chicago plant uses nearly 4,000 kilowatts to grind up junk cars into metal shreds for remelting.

Highways, too, require large amounts of power. The Washington, D.C., subway system, now under construction, will require 500,000 kilowatts, equivalent to the output of a good-sized generating station. The Toronto subway used 226.2 million kilowatt-hours in 1970 and the energy requirement will increase when the Yonge Street extensions open.

For electric cars, experimental models show about one kilowatt-hour for each mile of travel. If only a fraction of the internal combustion engine vehicles which average 10,000 miles a year were converted to electric propulsion, a great deal of energy would be required.

Dr. C. Netschert, a prominent energy consultant, has estimated that the ultimate conversion of the 110 million U.S. motor vehicles to electricity would require 450 billion kilowatt-hours, or about one-third the total U.S. output today.

Finally, urban renewal projects needed to replace outdated housing and make better use of costly downtown land will require a large energy component.

Toronto's proposed Metro Centre, billed as the largest urban renewal project in North America, will become a city within a city. It will cover 187 acres from Yonge to Bathurst streets between Front Street and the Gardiner Expressway.

Discussing its impact, columnist Alexander Ross wrote: "We're going to have almost as much 'downtown' between the Royal York Hotel and Lake Ontario as we now have between the hotel and College Street. We'll have underground shopping malls on the scale of the main drags in Kingston and St. Catharines. We'll have a city that's moving south towards its historic source, the Lakeshore, instead of sprawling forever northward."

Not only Toronto, but all municipalities will experience growth. Toronto architect John C. Parkin said in a recent speech that in the next 30 years Canada's cities must equal in size the building that has already taken place.

"Inside 30 years, the complete physical plant that has been built up . . . over the span of four centuries must be duplicated — roads, housing, transport, factories, utilities, public buildings, recreation facilities, parks, branch plants — the lot," he said.

Such tasks will require an immense amount of electric energy. By and large, increasing demands in Ontario will be met by fossil-fuelled or nuclear-electric plants

with up-to-date control methods that will ensure a better environment and quality of life. To the extent that nuclear-electric and hydro-electric power can be used, it will conserve fossil fuels for other essential needs.

But wise choices on fuel use for all purposes are essential. Guidance in this direction can be expected from Ontario's Advisory Committee on Energy, headed by Queen's University principal John Deutsch, which is undertaking a comprehensive review of Ontario's future energy requirements and supplies.

Among the areas of specific interest will be an assessment of the economic and social benefits which can be derived from a comprehensive and co-ordinated energy policy.

Mr. Parkin has pointed out that despite the major expansion faced by our cities, Canadians still have a lot going for them.

"We haven't yet made any irretrievable mistakes. Our cities are still viable; our air is not yet the air of death; we still have fresh water and free land."

Hydro's responsibility is to ensure that Ontario has an adequate supply of electric energy which, on balance, has a beneficial effect on our natural and man-made environment.

bringing 'em back alive

Defensi



by Bill Settatree

Defensive driving could save 850 lives a year in Ontario



Statistics show that traffic accidents exact a yearly toll of 1,700 deaths and more than 100,000 disabling injuries in the province. Property damage exceeds \$80 million. It's estimated that industry alone faces a staggering bill of more than \$100 million a year in lost production due to road fatalities.

According to the Ontario Safety League, highway carnage could be cut in half if defensive driving habits were employed.

Ontario's municipal utilities suffer their share of "fender benders." Spokesmen for the Electrical Utilities Safety Association maintain that traffic accidents are the next highest to electrical accidents in fatal injuries and property damage so far as the utilities are concerned. So EUSA this year expanded its activities to include a defensive driving course for utility personnel.

Six EUSA staff members were trained by the Ontario Safety League to conduct the courses. The first sessions were launched at Scarborough PUC and St. Thomas PUC in January. In two and a half weeks, 250 drivers from Scarborough had completed the program. In St. Thomas, 41 completed the program in two days.

"And that's just the start," said Moe Shepherd, one of the instructors. "More than 4,000 people from about 150 utilities will be covered this year. We feel that if we can improve a man's driving attitude, his attitude toward the job will change and his performance will be improved."

Public relations is also a consideration, he says. Each employee who drives a vehicle is advertising his utility, and careless or thoughtless driving just doesn't go over with the public.

The defensive driving course is basically an eight-lesson program. Lessons are normally conducted once a week for eight weeks. However, because of the large number of people taking the EUSA program, the course has been compressed into two half days, one week apart. Involved are films, demonstrations, discussion groups and a written test.

The program deals with such specifics as being passed by another car, passing another vehicle, rear-end collisions, backing accidents, expressway driving and the influence of drugs and alcohol.

Bill Hutchison, personnel manager for Scarborough PUC, is enthusiastic about the interest shown by his group in the program. "We enrolled all full or part-time drivers and may even include office staff in the future," he said. "Their personal safety is our concern."

In 1970, 108 Scarborough PUC drivers were recognized for completing the year without an accident. Twelve were honored for 10-year accident-free records. With 115 PUC vehicles travelling 1,068,919 miles, 14 accidents were reported in 1970. The utility is striving to improve on this record.

About 6,000 Ontario motorists take the defensive driving course each year. EUSA's participation will swell this number by 50 per cent.

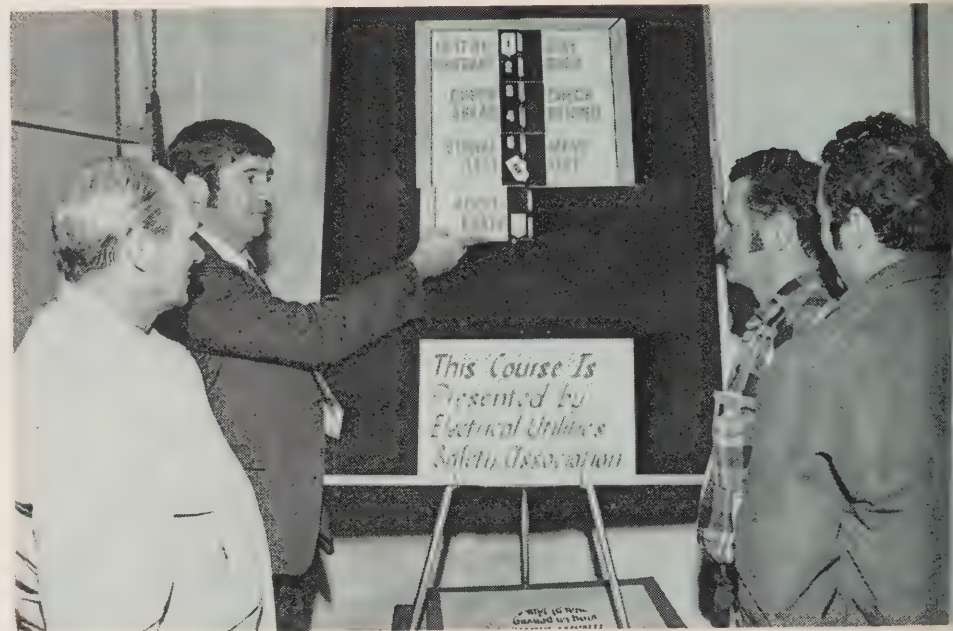
C. J. Hancock, supervisor of the Ontario Safety League's program of defensive driving, says the program was instituted by the Canada Safety Council in 1968. The Ontario Safety League became involved the following year. About 20,000 persons have taken the course in Ontario and more than 250,000 have been trained across the country.

The program has been described as "the hottest thing today in accident prevention." Major participants include General Motors, the armed forces, both national railways, major oil companies, automobile insurance companies and departments of government.

Courses are also arranged for inmates in correctional institutions through the Solicitor General's department

The Toronto Transit Commission is a strong advocate of the program. The TTC enrolled three groups of 45 high-accident drivers and reported later that their accident-rate had been reduced by 60 per cent. Drivers for Canadian National Express were involved in 25 per cent fewer accidents and, two years after taking the course, 20,000 servicemen and civilian drivers for the National Defence Department were involved in 1,651 fewer accidents. □

Bill Hutchison, personnel manager for Scarborough PUC, discusses defensive driving with employee Al Parker. Below and right: some of the finer points of driver safety are illustrated by EUSA instructor.



Return of equity under fire

District 4 president J. L. Christie, right, welcomes the Minister of Labor and Financial and Commercial Affairs, Gordon R. Carton, to the meeting. With them is past president J. P. MacBeth.

North York Hydro resolution calling for the Ontario Municipal Electric Association petition Ontario Hydro to "abandon immediately the return on equity and the charge for the return in the present method of power costing" was defeated at the District 4 meeting in Toronto.

North York Hydro Chairman John R. Dunn told delegates that his utility feels so strongly about removal of the return on equity that it took the matter to Task Force Hydro.

Mr. Dunn said the system presents an inequitable situation which should be done away with immediately." He added that the cost of return on equity is not a true measure of the cost of power, it penalizes a utility's sales efforts and discourages the growth of the system.

Mr. Dunn claimed the principle of the return on equity is in conflict with the pooling principle applied to "other and true components of power cost. It's not like the equity in the Ontario Hydro system. It's more like 10 per cent of the equity being owned by the municipalities," he said. He pointed out that North York Hydro is "completely dissatisfied with the OMEA's decision to retain the return on equity clause in the cost of power charged to the utilities.

While we prefer to use the OMEA as a forum for discussion on this subject, we're not unmindful that a proposal to drop the return on equity clause has been turned down before, and we're not unmindful of the voting privileges heavily favor the smaller utilities. But we still question the action of the Power Costing Committee recommending retention of the return on equity.

In the final analysis," Mr. Dunn said, Ontario Hydro calls the shots, and the municipal utilities have no equity in the system."

The return on equity is a bookkeeping means of representing some return on a utility's capital investment in the Ontario Hydro system. It begins in a utility's 41st year of operation. The cost of paying this return is divided among all the utilities in



proportion to their individual kilowatt demands.

In the aggregate, and on the books of Ontario Hydro, the return on equity is exactly equal to the cost of return. For the individual utilities, this is not usually so. Those of long membership in the Hydro family and steady growth in load will find that their return on equity exceeds their cost of return. On the other hand, those of relatively recent membership or those in which load growth in recent years has been unusually high, will find that the return on equity is less than the cost of return.)

Mr. Dunn referred to OMEA Power Costing Committee Chairman Dr. R. H. Hay's explanation of the system of return on equity as "membership in a club." "Indeed, as far as North York Hydro is concerned, it's the most expensive club in the world, and at \$750,000 a year it's a membership we can ill-afford."

East York Hydro Chairman J. L. Christie argued that equity is "no good at all if there's no return. I feel the municipal utilities own Ontario Hydro and don't feel the time has come when we want to say we don't."

He could see nothing wrong with older utilities getting more return on their equity in that they've been paying into the system longer, and asked that the resolution "be decisively defeated."

Toronto Hydro Chairman R. R. Horkins complained that a resolution of this magnitude should never have been presented on such short notice. He was "diametrically opposed" to the resolution.

Speaking for Oakville PUC, delegate Tony Green said he felt that Hydro in Ontario must be prepared for change. "The formula for the return on equity was designed 60 years ago, and although I don't think we should necessarily abandon the equity I feel we should take a damn good look at the formula. The way it operates now, it's putting many utilities into a deficit position and I feel the parent association should hold further discussion on it. Something needs to be done — in the case of Oakville, it's costing us something like \$139,000 a year."

District president John MacBeth suggested that many of the "paying utilities find they're still on the paying end every

year and that's penalizing those who are, in effect, building up Ontario Hydro's system." He said he was a "believer" in the equity system, but he believed a utility could have equity without necessarily having a return on it."

In other resolutions, delegates voted to ask the OMEA to seek an amendment to the Local Improvement Act to permit the burying of overhead lines under local improvement financing, and to have minutes of the district's annual meeting published and distributed within a month.

Government for the seventies

Explaining the reasons behind the current Ontario government reorganization, Labor and Financial and Commercial Affairs Minister Gordon Carton said that in expanding to meet the demands of new policies and programs the structure had become so large and complicated it was difficult to manage.

"It was also apparent that the operation of individual government departments as separate and distinct entities was no longer appropriate. Issues had arisen that involved more than one department, resulting in unnecessary overlapping in many areas of government."

Mr. Carton said a committee on government productivity was set up in 1969 to "inquire into all matters pertaining to the management of the Government of Ontario and to recommend and help implement programs to improve its efficiency — to create a government structure to meet the challenges of the 70's and beyond.

"From the outset, the committee concentrated its efforts on areas where it was indicated there was a need for improvement and where implementation of new systems would be of greatest benefit to the people of the province in terms of increased efficiency and levels of service."

The new structure of government, Mr.



Carton said, is the grouping together of 22 departments and about 250 authorities, boards and commissions into five new entities that relate to social development; environment and resources development; justice; finance and inter-governmental affairs; and revenue and government services.

Under the scheme, he added, there will be ministries and policy fields. A ministry will be comprised of a department and its related agencies. A policy field will be a self-contained area of public affairs corresponding to a major purpose of government. Related ministerial programs and activities designed to achieve that purpose will be included within the policy field.

"The reorganized government will have three policy fields. The policy field for social development will be concerned with the well-being of individuals and families and will foster the development of favorable social conditions for the citizens of Ontario.

"The policy field for environment and resources development will concern itself with the planned development of provincial resources in the broadest sense, including issues relating to provision of

employment, availability of services for outdoor recreation, pollution control, the planning and development of all modes of transportation.

"The policy field for justice will focus on the traditional responsibilities of the government in regard to the established legal system and administration of the courts, as well as on the protection of the basic rights of the citizens," Mr. Carton said.

Two new ministries will be created to cover activities which do not fit logically into any of the three policy fields. They include the ministry of finance and inter-governmental affairs, which will maintain a suitable balance between the policies of the several governments which affect the people of the province, and the ministry of revenue and government services, which will be responsible for administering the collection of most of the government's revenue.

"To head these two new areas of government activity, there will be two types of Cabinet minister — policy ministers and ministers with program responsibilities.

"We are not instituting a division of Cabinet responsibility, but rather a division

...who will head District 4 for the coming
include, back row: J. P. MacBeth, Etobicoke,
president; L. F. Andrews, Uxbridge; R. R.
kins, Toronto; M. J. Damp, secretary-treasurer;
D. Hamilton, Aurora, and W. C. Rowney,
on. Front row: M. W. Broley, Scarborough,
vice-president; J. L. Christie, East York,
ident, and J. R. Dunn, North York, second
-president.



the Cabinet workload," Mr. Carton
ed. "Some ministers will be able to
concentrate on specific areas, but the
ultant findings will still be in the form of
commendations to the whole Cabinet.
d each member of the Cabinet will
in his full share in the responsibility
ultimate decisions." □

Action on regions begins this year?

Government action should be forthcoming
year on the position of local Hydro
missions within regional governments,
going District 4 president John
MacBeth told delegates.

MacBeth said he "regretted" the
association had not been more forceful in
position concerning regional govern-
ment in the northern part of the district
during the past year. "However," he added,
they are hopeful of getting Hydro ad-
ministration straightened out in the regional
municipality of York in the very near
future."

MacBeth is chairman of the OMEA's
environment legislation committee and

represents York West in the Ontario
Legislature. □

Hydro month is now a week

Hydro Month — the public relations cam-
paign sponsored by District 4 — was neither
an overwhelming success nor a miserable
failure, said J. L. Christie, of East York,
PR committee chairman.

Mr. Christie told delegates that perhaps
the most successful aspect of the promo-
tion was that "every commissioner in the
district was reached."

But where the campaign failed most was
in the committee's efforts to involve com-
mission employees. "It would not be an
exaggeration to say that greatest opposi-
tion came from utility staff members.
This might be attributed to their profes-
sional ability to analyze a proposal and
reject it because of lack of value, or it might
be that some did not wish to become
involved in the extra work entailed," Mr.
Christie said.

"There were others, on the other hand,
who wholeheartedly supported the

project and contributed to its success
within their own municipality," he added.

On a motion by Oakville PUC commis-
sioner Tony Green, delegates voted to
hold a Hydro Week patterned after last
year's campaign.

Mr. Green said he felt all utilities in the
district should follow the pattern estab-
lished last June, but should concentrate
their efforts on a week-long promotion
rather than attempt to run it for a month. □

Dillon's

Rate increase delay opposed

Withdrawal of funds from Ontario Hydro's
rate stabilization reserve to delay rate
increases was opposed by District 5 dele-
gates at Jordan.

They endorsed a resolution by R. W.
Howarth, chairman of Niagara Hydro,
criticizing Hydro's action in postponing
rate increases due on January 1.

Mr. Howarth said that the rate stabilization
reserve was established to offset increased
costs incurred only by temporary circum-
stances. "Present increases are a con-
tinuing trend," he added, saying that the
decision to dip into the fund was merely
postponing the inevitable. "It will do noth-
ing but make more bitter the day of
reckoning when it eventually comes."
The resolution was opposed by Mayor
A. Pietz, of Welland, who suggested that
endorsement would indicate the district
was advocating rate increases.

W. Sam Jennings, Niagara Hydro commis-
sioner and past president of the district,
replied that they were, in effect, advocating
a rate increase so that Ontario Hydro
could recover some of the rising costs of
power.

Ontario Hydro Chairman George Gather-
cole later explained that the deferment of
rate increases was an interim measure and
would be reappraised in the spring.

Richard Dillon, executive director of Task
Force Hydro, told delegates that the biggest

Past president Stuart Chapple congratulates G. H. Beckett, left, of Hagersville, and Cecil of Thorold, both recipients of 15-year long-service awards. Below: the men who will conduct affairs of District 5 during 1972 include, seated, Lorne Reeder, St. George; George Butcher, S president; Gordon Robertson, Lynden, first vice-president. Standing, George Burley, Niagara Stuart Chapple, Stoney Creek; E. B. McPherson, Port Colborne; I. B. Sveinbjornson, Simcoe, sec Frank Kaupp, St. Cath

issue facing Hydro was ecology. "We're in a time of change and Hydro, like everyone else, must cope with it."

Mr. Dillon emphasized that the task force is not a witch hunt or a Royal Commission. "We're not here to find out what's wrong with Hydro today, but to ensure that nothing goes wrong in the future," he said. He noted that nearly 120 briefs had been submitted since the task force began asking for submissions. These were now under detailed study.

"We're rapidly approaching the crunch and will start formulating recommendations. They will be discussed with the people on whom they'll have the greatest effect," he said, adding that he could see no reason why the June 30 deadline could not be reached.

OMEA President Andrew Frame referred briefly to the question of regional government, an issue which has plagued Niagara area municipalities. He said he had worked hard to bring about a settlement to the question and "I can assure you that I'll continue to work in that direction during the next few months of my term."

Mr. Frame referred to District 5 as one of the most active and the attendance of 135 at the meeting indicated the interest in OMEA matters.

Delegates also heard from two Ontario Hydro engineers — W. E. Lawler, who discussed the provincial power network, and J. G. Cassan, who spoke on aesthetics and tower design.

Mr. Cassan outlined progress in developing more attractive-looking transmission systems and discussed the problems of such alternatives as underground high-voltage transmission.

Saying that underground transmission is uneconomic at the present time, Mr. Cassan cited some comparative costs.

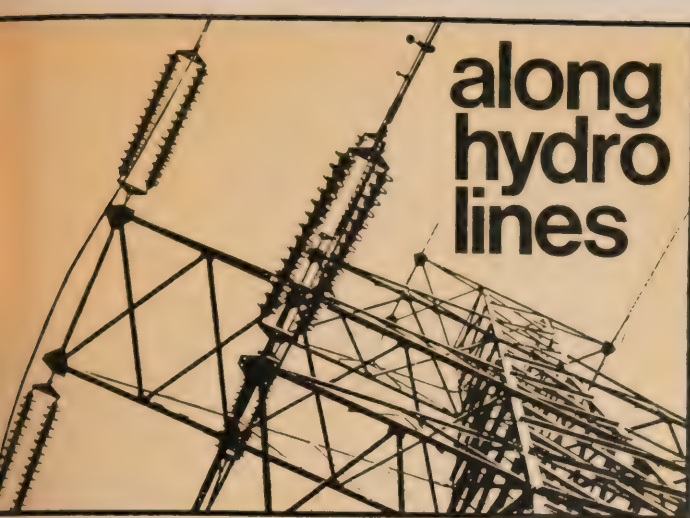
"If we were to impose a 10 per cent surcharge on the cost of power and utilize this money for underground installations, we'd have about \$50 million each year for that purpose. This money would finance 200 miles of low-voltage sub-transmission system or 25 miles of heavy-duty 230-kv line or 10 miles of 500-kv transmission."



Mr. Cassan said that over the next seven or eight years, Hydro would have to build about 900 miles of 500-kv line. It was obvious that underground was out of the question.

Referring to studies to improve the appearance of overhead lines, he said Hydro was reviewing proposals from two Toronto firms with an eye to developing a prototype system. □





along hydro lines

Utility rates up

Ontario Hydro has announced an 8 per cent increase in the cost of power to the more than 350 municipal electrical utilities across the province. The increase is effective July 1.

In announcing the boost, Ontario Hydro Chairman George Gathercole said: "Our analysis confirms that power costs will continue to rise, necessitating a further increase at the beginning of 1973 and for a number of years to come."

However," he added, "we are taking into account the fact that Task Force Hydro will be presenting a report later in the year and we believe we should not anticipate their findings or conclusions."

Last November, Mr. Gathercole announced that Ontario Hydro was deferring increases to municipal utilities which had been expected January 1.

He then said Hydro was "avoiding any action that would hamper or impede the special measures that have been adopted to stimulate the economy."

It was emphasized at the time that the deferment was a temporary one, since rising costs must ultimately be met out of the proceeds of rates.

The adjustment will not produce sufficient income to avoid a substantial draw on the rate stabilization reserve. The rate increase will produce an estimated \$15.5 million, whereas the draw on the reserve will be about \$41 million.

Contracts between Ontario Hydro and direct industrial customers run on a January-to-December basis, therefore no adjustment can be made until the beginning of 1973. No increase in rates to rural customers is being made at present, "but the matter is being studied," Mr. Gathercole said. □

\$96 million power pact

Ontario Hydro and Hydro-Quebec have signed a \$96.2 million, five-year agreement calling for the purchase by Ontario Hydro of power from Quebec. The deal is made possible by the development of the Churchill Falls project in Labrador.

The agreement, approved by the governments of both provinces, covers the period from June 1, 1973, to May 31, 1977. It provides for delivery to Ontario Hydro of 800,000 kilowatts in the first year, 1,000,000 kilowatts in the second year, and 500,000 kilowatts in each of the last two.

Owing to the short tenure of the contract, the purchase will not affect Ontario Hydro's long-term commitment for new capacity," commented Ontario Hydro Chairman George Gathercole. "Generating units still under construction at our Pickering, Darlington, Bruce and Lennox sites, totalling more than 10,000,000 kilowatts, will be proceeded with as planned." □

Powerhouse museum

The Daley Brothers Powerhouse, which for years provided electrical service to the village of Magnetawan, is getting a new lease on life. It's being converted into a museum as "a much-needed tourist attraction for the area," says Reeve Arthur Raaflaub.

Among the chief exhibits will be the plant's large waterwheel and generator. Although they have long been silenced, they will be restored to their original condition. □

Candid camera

"Action... camera," says production assistant Dorothy McDougall at the start of a television interview on the aims and objectives of the AMEU. Don White (right), association president, was interviewed by Bill Settatee, of Hydro News, and the film was distributed to cable TV companies in North York, where Mr. White manages the local electric utility. Four Toronto cable firms screened the production to an estimated 175,000 homes.



Scene one, take one . . .

Cable television is considered an excellent medium for the utilities as was stressed by the OMEA-AMEU PR co-ordinating committee recently in a new section of its handbook on public relations. □

Marketing brief

The electrical manufacturing industry has gone on record as endorsing Ontario Hydro's marketing policies.

In a 24-page brief to Task Force Hydro, the Canadian Electrical Manufacturers Association (CEMA) has said that Ontario Hydro must perform under the discipline of market demand and market forces "in the same manner as any private business organization."

"Without a well-planned marketing program, most organizations quickly lose market participation, and Ontario Hydro is no exception," the 158 member companies told the task force.

"The provincial electrical utility has a number of sophisticated, aggressive, free-enterprise competitors, each conducting strong marketing campaigns in Ontario aimed at the electrical utilities' future market potential."

"Such competitors, by their very nature, can and do react very quickly to market opportunities, and once the consumer selects a competitive source of energy, that market is lost to Hydro and the rest of the electrical industry for at least a generation," the brief states.

CEMA also points out that other publicly-owned utilities, such as railroads, airlines and broadcasting corporations, have found that strong marketing programs are needed to keep prospective customers informed of their services and to offset the marketing

campaigns of their free-enterprise competitors.

"Marketing activity is in the public's interest in that it is consistent with social, economic and ecological interests and ensures the lowest possible cost of electricity for Hydro's customers.

"It is the basic tool for raising our future horizons and will create new opportunities by which all society will benefit," the CEMA brief states.

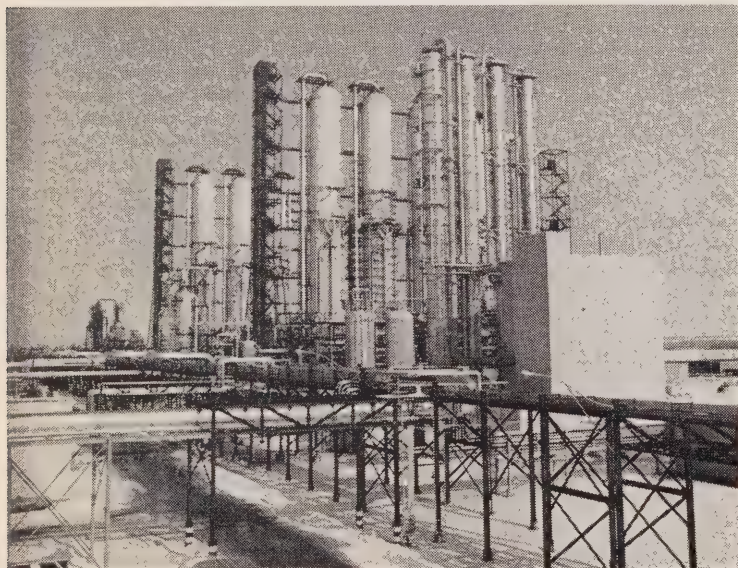
Douglas Point shutdown?

Because of a shortage of heavy water, Atomic Energy of Canada Limited has proposed a temporary shutdown of the Douglas Point station on Lake Huron and transfer of its 200 tons of heavy water to Pickering for that station's third unit start-up this spring.

Should the Douglas Point plant be closed down for the summer, staff would be kept on for maintenance and repair work.

Sam Horton, operations manager at the Bruce Nuclear Power Development, says: "This would give us a much needed opportunity for maintenance and modification at the station. The planned work involves many people, so we don't anticipate any significant change in employment levels."

It has been apparent for some time that heavy water would be in short supply for a few years, primarily because of the failure of the heavy water plant at Glace Bay, N.S. Production at the Port Hawkesbury plant, also in Nova Scotia, has been delayed, too. □



Gearing up

Fall start

Bruce Heavy Water Plant is scheduled to start production early in the fall. The plant's first enriching unit has already been commissioned by Lummus Company of Canada Limited, the engineer-constructor, and turned over to Ontario Hydro. Commissioning of the second unit is continuing.

The first of several loads of hydrogen sulphide gas, an essential element in heavy water production, will begin arriving by train from Fort Saskatchewan, Alberta, next month. The gradual filling of the 285-foot towers will then begin until the pressure reaches 300 pounds a square inch. The production process is based upon the exchange of heavy deuterium atoms between ordinary water and hydrogen sulphide, at different temperatures.

In full operation, the plant will be capable of producing 800 tons of heavy water a year. □

Hydro pioneer

William T. Merrett, the man who was mainly responsible for bringing Ontario Hydro service to West Lorne, and who sat on the town's Public Utilities Commission for 22 years, has died at the

age of 89. Even in his 80's a familiar figure at OMEA meetings, Mr. Merrett could be seen at the annual OMEA-A convention in Toronto arguing the pros and cons of power co-ops or distribution systems with a bunch of cronies.

Mr. Merrett emigrated to Canada from London, England, when he was 21. He'd previously served a seven-year apprenticeship as a builder. He first settled and worked in Windsor, then in the west, but was forced to return to Ontario by the depression. He then that he settled in West Lorne and started taking an interest in Hydro.

Mr. Merrett was responsible for the structural work of the West Lorne Lighting Company's steam plant and in 1916 joined the town council, which at the time was considering petitioning Ontario Hydro to supply power to the community. Being a junior member, he was told to collect 50 signatures on a petition but only managed to get 14.

However, the petition did go forward and West Lorne got power, the local distribution being taken care of by a committee of council. Mr. Merrett got the job of building the local substation.

The PUC was formed in 1948. Mr. Merrett became a member of the outset in his capacity as reeve. He remained a commissioner for 22 years, several of them as chairman.

God's agin' it

A Lutheran minister, pastor on the University of Montana campus, has testified that God is against a proposed gas and electricity rate increase by Montana Power Company.

Rev. John Nelson told a Montana Public Service Commission hearing that "the Lord is for the welfare of society and the welfare of the people." He said the rate increase proposed "is not in that interest."

United Press International reported that of the 150 people present at the hearing, "the majority agreed with God."

Montana Power is seeking a 17 per cent increase in electricity rates and a 34 per cent hike in the cost of natural gas.

Pride of Burford



All aboard

Burford Hydro's gleaming white aerial ladder truck is the pride of the police village. Proudly showing off their new acquisition on truck, John Wedge, maintenance foreman, and G. W. V. secretary-treasurer of the utility. On the ground are Vince Hydro chairman, Dave Johnson, secretary of the board of trustees, and Dave Stewart, chairman of the trustee board.

hat a bore ...

thermal boring device that can melt its way through solid rock has been successfully tested by scientists from the U.S. Los Alamos Scientific Laboratory.

In the first field tests, a series of two holes, two inches in diameter and 12 feet deep, was sunk with the rock-melting or subterrene device. Tentative plans are to melt a four-inch diameter hole 1,000 feet deep by mid-1972.

The electrically heated device, with a three-kilowatt power supply, heats to more than 1,200 degrees Fahrenheit at its tip. SL scientists have used one- and two-inch diameter subterrenes of this type to melt holes through granite, tuff, basalts, gneisses, and Santa Fé conglomerate.

The subterrene is typically cone-shaped. As it advances, molten rock is forced into voids in the walls of the hole and backward toward the periphery of the device. The rock is frozen in place by a cooled section of the unit in such a way that an obsidian-like glass lining is formed on the wall. This is said to be one of the most attractive features of the subterrene. These linings are impermeable and strong so that hole walls are sealed and supported against cave-in.

The goal of the project is to develop both electric and nuclear subterrenes, but work has not yet started on the nuclear version. Present concepts call for the use of a compact high-temperature nuclear reactor whose thermal energy would be transferred to the penetrator through heat pipes.

Among the applications envisioned for thermal boring are excavation of highway and railroad tunnels, conduits for drainage and irrigation, wells for various liquids, underground chambers to contain nuclear and thermonuclear power reactors, and holes for exploration or research at depths beneath the earth's surface that cannot be reached with conventional methods. □

Worth weight in gold

British fine china maker is using electronic air cleaners to mine dust from the air in its plant. The company reports the system is "worth its weight in gold" in terms of substantial savings, and it also provides healthier working conditions.

The Worcester Royal Porcelain Company has installed seven electronic air cleaners after running tests to determine the amount of gold dust in the air and whether mercury oxide, also present, might pose a health hazard to workers.

Although safety standards were being met, the firm decided the improvements would be desirable.

The result, says a company spokesman, is a reduction in airborne gold dust to "negligible amounts" and increased health safety for craftsmen. The savings in reclaimed gold paid off the investment in 15 months. □

Artificial heart

Government scientists have announced the development of a totally implantable artificial heart and a nuclear-powered permanent heart.

So far, both devices have been used only in calves, but National Heart and Lung Institute scientists say they could eventually help sufferers from cardiovascular disease, which kills a million Americans annually.

Dr. Lowell T. Harmison, project chief, suggests the latter part of the decade "seems a reasonable target" for the first human use of the devices. The project has been underway since 1964.

The artificial heart has been tested successfully in 75 calves during the past six months, but the tests so far have lasted from two to 10 days.

Although the artificial heart is battery-powered, Dr. Harmison says it can also be operated by the same type of miniature

nuclear-powered steam engine now pumping the assistant heart of a calf that underwent surgery in February.

It's estimated that a complete artificial heart might cost a patient between \$5,000 and \$6,000 plus hospital and surgical costs. This is comparable to the cost of a heart transplant operation.

MHD pact

The Edison Electric Institute and Stanford University have signed a three-year agreement initiating a research program to determine the extent of air quality problems associated with projected magnetohydrodynamic (MHD) power plants and to develop means of reducing such problems to a minimum.

It has been suggested that reduction of the emission of sulphur oxides and particulate matter from MHD exhaust gases seems likely. Nitrogen oxides, however, are not so easy to remove.

The project will study how and in what quantity these oxides of nitrogen are formed in an MHD system and whether it is possible to reduce them to a negligible level.

In the most promising MHD system at present, a fossil fuel such as coal or oil is burned with air, forcing hot combustion gases at high velocity through a magnetic field. By adding seed material such as potassium carbonate, the high-temperature gases become ionized and can conduct electricity. Interaction of the flowing gases with the magnetic field converts some of the kinetic energy directly into electric power. Gases then continue downstream to a steam plant and produce additional power. □

On with the show

Lakehead University's Cambrian Players played their last dress rehearsal of "Wait Until Dark" recently. It went without a hitch.

Except that the cast did, in fact, wait until dark. Rehearsal was an hour late — the result of a power failure at the school earlier in the day.

The school's main generator went off for about a half-hour around noon, but temporary repairs got the university back in business at the end of the lunch break.

Further repairs were necessary, and the original plan had been to wait until evening to shut down the generator. However, as it was study week, the drama group persuaded the authorities to shut down the plant in the afternoon instead. □

Oil contract

An Ontario Hydro contract valued at between \$70 and \$75 million has been awarded to Golden Eagle Canada Limited, of Montreal, to supply 25 million barrels of residual oil for Lennox generating station, the oil-fired power plant under construction at Bath, near Kingston.

Due to produce first power in 1974, Lennox will have a total capacity of 2.3 million kilowatts when completed in 1977. The purchase will provide sufficient fuel to carry the station through its commissioning stages and on into 1979.

The contract calls for the delivery of 13,530 barrels a day from January 1, 1975, to December 31, 1979. About 200,000 barrels of residual oil will be needed in 1974.

Golden Eagle will produce the residual oil at its refinery in St. Romuald, Quebec, on the south shore of the St. Lawrence River opposite Quebec City. The crude oil will come from Venezuela and Libya.

The oil will be moved to Lennox in unit trains. Ontario Hydro has been negotiating the purchase or leasing of tank cars. Three storage tanks at the station will be capable of holding 2.6 million barrels of oil. Two additional tanks will hold a further 40,000 barrels each, about enough for one day's operation.

At full capacity, the station's four units are expected to consume 3,120 barrels an hour. □

Century of A-power

Canadian heavy water-moderated reactors are expected to be economically competitive with other nuclear systems for an indefinite period, says W. G. Morison, Ontario Hydro's assistant director of generation projects.

Speaking at a Toronto seminar sponsored by the Ontario chapter, American Heating, Refrigerating and Air-Conditioning Engineers, Mr. Morison said CANDU reactors will continue to be fuelled with uranium until thorium becomes economic.

"There are sufficient fuel resources in Canada at extraction costs below \$30 a pound to last at least a century," Mr. Morison pointed out.

Development of fusion reactors utilizing deuterium, tritium and lithium will extend the world's energy resources by millions of times and is expected to reduce pollution problems, he added.

Sunny outlook

Construction of a panel five miles square and located 22,300 miles above the equator may be the answer to harnessing the heat of the sun for the production of electricity, J. G. Warnock, vice-president of Acres Limited, of Toronto, said at the same seminar.

Mr. Warnock said the panel would intercept solar radiation and convert it into electric power. The electric power would in turn be converted into microwave radiation and beamed to a receiving station on earth.

On the scale proposed, such a device could provide sufficient electric power to supply New York City.

The receiving antenna would cover about six times the area needed for a coal-burning power plant of the same capacity, and about 20 times the area needed for a nuclear plant.

At the start of this decade, Mr. Warnock said, about 1,350,000 kilowatts of generating capacity were being drawn from geothermal sources. Evidence has been accumulating that this resource is much more significant than previously thought.

"It is believed now, for example, that between 50 and 60 per cent of the land territory of the USSR contains thermal waters with energy comparable to all the country's peat and hydrocarbon resources combined.

"California's Imperial Valley alone has geo-thermal waters that could give, according to estimates, up to 20 million kilowatts of generation. There is also a potential for energy recovery from snow-capped mountains near warm valleys, and in utilizing the relatively high differential between land and deep sea temperatures. "We have recently investigated temperature levels at 2,500 to 3,500-foot depths and found 85 to 95 degrees occurring in the rock strata," Mr. Warnock said.

Heavy water route

A program underway in Ontario Hydro's research laboratories is concentrating on electrophoresis as a technique for manufacturing heavy water.

The electrophoresis apparatus consists of a metal tube containing a fine wire. The tube is filled with steam and the wire charged to create an electrical field which draws the lighter molecules toward the central wire while repelling the heavy deuterated steam molecules. Convection currents carry the lighter molecules toward the top of the column along the wire. The heavier molecules fall down the walls of the tube.

The electrophoresis technique could prove less expensive than the present process of producing heavy water based on the chemical exchange of deuterium between water and hydrogen sulphide. Construction of the equipment should be simpler and the energy inputs should be less, the researchers say.

Computer service grows

London PUC has expanded its computer billing service to Ontario utilities and is now offering it on a province-wide basis, says Don Grace, manager of administrative services. Twenty-eight utilities have been enrolled since the service was started in 1968.

"The costs are still the same . . . 15 cents a bill," says Mr. Grace. The latest utilities to join are Amherstburg, Goderich and Kapuskasing.

"Kapuskasing is particularly significant since it is about 1,000 miles from us. Most of our customers are around 100 miles distant," he adds.

Mr. Grace says consideration is being given to the installation of a telecommunications system by which information would be dialed to London from distant utilities, thus speeding up the billing process.

municipal briefs

Windsor Utilities Commission has phased out its appliance department. The 11 employees affected have been transferred to other jobs in the utility.

Sault Ste. Marie PUC meter readers recently donned snowshoes to avoid wading waist-deep through more than 40 inches of snow. **St. Catharines City Council** continues its efforts to have the city secede from the regional municipality of Niagara. The city council voted 10-2 in favor of paying the \$150 fee required for the introduction of a private member's bill in the Ontario Legislature calling for the secession.

Galt PUC has just set a record for itself by planting 452 trees in 1971. Its previous one-year high was 300. The utility is removing about 350 dead elm trees a year, but did enough planting this year to show a net gain.

Charles Pearce has been appointed manager of the Orono and Water System. Mr. Pearce has had many years' experience as superintendent of Bradford PUC.

Dutton PUC's superintendent, Walter Hull, has retired. A whole town turned out to pay tribute to the man who served the community for 41 years as water commissioner, Hydro superintendent and fire chief. Speaking of Mr. Hull's long career, chairman C. J. Beill said: "Walt was on call 24 hours a day, seven days a week, for the many years he served this community." **Smiths Falls Hydro** manager Gordon McNeely is due to retire but will remain with the utility as assistant to his successor in September. Clarence Labelle, system superintendent, takes over as manager.

The Meaford Express came out on time in the second week of February, perhaps the best tribute of all to its editor-publisher Walter B. Brebner, who suffered a fatal heart attack at home earlier that week. A long-time friend of Meaford PUC and Hydro, a week seldom passed when there wasn't some mention about Hydro in Mr. Brebner's paper.

Toronto Hydro driver John Kyle has been presented "good citizen" award by the Board of Police Commissioners of Metropolitan Toronto for his part in thwarting an abduction and car theft. He gave chase in his utility truck after seeing a girl pounding on a car window.



as don wright sees it

Folks who like to travel and have an urge to explore will be fascinated by a recent publication of the British Medical Association. This little red book sells for 25 cents and takes its readers on a grand tour of some of the most exotic parts of the gastro-intestinal tract with a dozen fun-filled stops between the esophagus and the duodenum.

Intended for distribution through pharmacists, the booklet moves quickly around the system taking in wind, heart burn, diarrhea, constipation, gastritis and hemorrhoids without stopping long enough in any one area to give the reader indigestion. In spite of its coy title, the book is straightforward in demolishing some of the myths commonly associated with the inner man. Typical of its strong talk is the advice on nutrition. "Eat what the hell you like is wise counsel," it suggests "and should be proffered more often."

The notion that burping is good for you is just a lot of wind," the book goes on, and there is food for thought in the suggestion that well-fitting false teeth are essential to good digestion. "Otherwise," it says, "patients tend to wear them socially but take them out to eat."

Oh yes, the wispy-washy title of the book is "You and Your Guts."

Another good travelogue we hope to find time for soon has been written by T. Phillipson. Judging by the title, the sea for the book was probably stolen from John Gunther but its subject area is somewhat more confined than the "Inside Africa" series.

It's called "Inside the Rumen" and the author is described as "something of a rather figure to those concerned with the men."

We thought at first they had misspelled mania, but the book really is all about the first stomach of animals that go about chewing cud.

Don't laugh. Ruminants yield 70 per

cent of the world's meat protein and almost all of our milk and milk products. It's good to know that someone is concerned about their tummies.

■ Other recent publications which have come to our attention and sound interesting include: "Aerodynamic Noises Produced by a Gliding Owl," "Nonshivering Thermogenesis," and "Lives of British Lizards." The latter is available from Goose and Son of London while the one about shivering was produced by "a small group of internationally acknowledged leaders in the field of thermoregulatory thermogenesis."

■ Getting back to medicine for a moment, we are reassured to find that even our doctors are concerned about pollution and are prepared to lend their assistance. Speaking at a medical conference in California recently, one doctor recommended that "a procedure be applied universally in which a connection is established between the rectum and stomach — a single closed loop — not only to reduce human pollution but to insure recycling."

Predicting opposition to his ingenious scheme, the doctor went on to point out how this was likely to develop among the various disciplines. Government regulatory agencies concerned that the primary loop might fail would demand a second loop — the so-called double loop system.

Conservationists would be likely to declare that the system has no merit at all since small releases might continue to occur. They'd demand zero release.

Public relations men might suggest painting the effluent white while economists would argue that the same thing can be achieved by raising dime toilets to a quarter.

In his parting remarks to the conference, the good doctor said: "Mr. Chairman, my hope is that we can, together, address ourselves to our common problems and NEVER lose our sense of humor."

To which we would only append a hearty AMEN.

■ Have you taken stock of your blood lately? It could be worth its weight in gold. One fellow in Detroit has given up his job on the assembly lines and intends to spend the rest of his life bleeding for a living.

He figures on netting a tidy \$12,000 a year from the sale of his blood, but don't plan on following suit unless your haematocrits are a bit unusual. His blood contains some kind of thing called anti-Lewis B and fetches a cool \$1,500 a quart.

■ Life is full of its little tragedies and some of them arise directly from changing social mores and the march of progress. Among

the many highly skilled workers who have been displaced lately by the shifting economic pattern is an amusement park air blowing machine operator from Washington. Hot pants and miniskirts led to his downfall.

His job was to release a stream of air through vents in the floor at the appropriate moment in order to reveal more feminine charm as the girls entered the fun house. In his own pathetic words: "An operator had to have a keen sense of timing otherwise the skirts wouldn't be wafted high enough to create the desired effect. You don't acquire a skill like that overnight."

It's impossible, of course, to waft hot pants. And miniskirts are already so short that an air-lift doesn't make much difference.

Professional acclaim is heady stuff and it's hard not to shed a tear for this fellow who once stood at the head of a proud tradition.

"Many a time," he recalls, "when I wafted a pretty girl's skirt above her waist, the guys hanging around the fun house would give me a standing ovation."

Sic transit gloria.

■ And what are we to make of that suggestion by a prominent Chicago doctor that sex is good for the heart?

"During the next year," writes Doctor Eugene Scheimann, "millions of men will suffer from painful, often fatal heart attacks. Ironically, many of these attacks could be prevented by one very simple, very cheap and very pleasant treatment: more sex."

That's all very well, but it's the men who are having the heart attacks and love is a two-way proposition. How far are the ladies willing to go in order to alleviate our cardiovascular problems?

According to the doctor, sex exercises every muscle of the body and strengthens the heart by making it pump more blood for a short period and then relaxing.

Every man to his own choice, of course, but there is still much to be said for the push-up and the double-knee bend.

■ Or is there? Since Roma's Italian League football team began sending wives along with the players on long out-of-town schedules, the team quickly moved up from mediocrity to third place in the standings. The coach broke with a lifetime policy of monastic discipline for his team in deciding that sex and soccer do make good bedmates. Now he'll be discussing the advantages of matrimony with the bachelors on his squad.

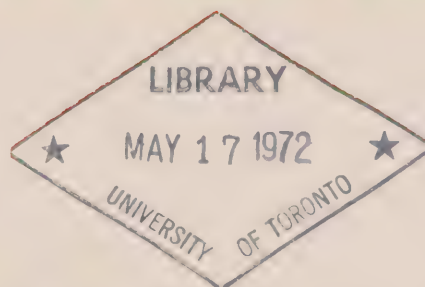
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NOTHING TO SHOUT ABOUT CONVENTION TIME

end of the Line
TOWN OF FIRSTS



ontario hydro news

april/1972



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Hydro and government policy

When Mr. J. D. Muncaster, chairman of the steering committee of Task Force Hydro, spoke to the joint annual meeting of the OMEA and AMEU, March 1, he said:

"In our consideration of Hydro as an instrument of government policy we have endeavored to identify those policy issues which, taken together, will determine the areas of mutual concern between public utilities and the governments to which they are accountable."

In the light of this and other statements in Mr. Muncaster's address, there appears to be little doubt that the Task Force is considering the concept of Hydro as an instrument for the implementation of government policy as a fundamental element in the electrical power industry's mandate from the Government of Ontario.

Because the term "instrument of government policy" is open to interpretation, we asked Mr. Muncaster to expand on this concept as he sees it. These are his observations:

"When the Government of Ontario decided some 66 years ago that our electric power industry should be publicly owned and that there should be 'power at cost,' the intention was clearly that of protecting the citizen against monopolistic prices and ensuring that the benefits from the enterprise would be widely shared. As the Task Force has stated, Hydro has correctly interpreted its mandate.

"However, as we move into the future, considering the size and potential of Ontario Hydro's influence on the social and economic patterns of this province, it becomes evident that increasing numbers of policy issues facing the provincial government are also issues facing Hydro.

"As I indicated in my talk to the two municipal Hydro associations, Task Force Hydro is giving consideration to mechanisms which will ensure an electrical generation and distribution system responsive to government policy encompassing a broader range of issues than has been formally recognized in the past.

"Included are a number of areas having to do with the economic development of the province, such as rate of return on invested capital, energy policy, discriminatory pricing, environmental policy and cost effectiveness.

"It is government's role to ensure that all the issues are taken into consideration in establishing a consistent, coherent policy capable of implementation.

"As I see it, Hydro's role is to provide the necessary input and 'expert advice' upon which policy can be based and to produce and distribute electrical energy in support of this policy. The development of policy thus becomes a joint effort which is satisfactory to both.

"Both government and the utilities must recognize that many of their policy decisions jointly impact on 'Mr. Citizen' and these decisions cannot be made in isolation if Mr. Citizen is going to be adequately served.

"The basic concept I have been attempting to describe is not new. Hydro has long conducted its operations in support of government policy. But, as I have said, growth and changing social and economic values and conditions are making this process ever more complicated and difficult to deal with effectively. Hopefully, a clear definition of these responsibilities will be among the results of the Task Force studies.

"Key Hydro personnel have been involved at all levels of our studies and any policy which is developed will be consistent and implementable to the degree necessary for the efficient operation of the Hydro system." □



SOMETHING TO SHOUT ABOUT

Exactly one year to the day from the start-up of Pickering generating station's first nuclear reactor, ceremonies were held to mark the official opening of the 2,160,000-kilowatt plant.

It was a golden opportunity to hail a major scientific advance, the significance of which was stressed repeatedly in the speechmaking that took place within earshot of the spinning generators.





Commenting on the success of the venture, Ontario Premier William Davis said: "During one month recently, this station we're officially opening today had a power output that exceeded any other nuclear plant in the world. And that's with two of its units still to become operational."

Mr. Davis said Pickering was the third step in Ontario Hydro's nuclear power program. The first step was the 20,000-kilowatt Nuclear Power Demonstration (NPD) plant at Rolphton.

"The second step, and this is where the going eventually got rough, was the 200,000-kilowatt Douglas Point station which was built by Atomic Energy of Canada Limited in co-operation with Ontario Hydro and began production in 1967.

"The Douglas Point plant was a prototype and it experienced teething problems that naturally attracted considerable publicity and carping by its critics. After all, Douglas Point was not a conventional thermal plant, therefore it was suspect. But surveys have shown that its problems were no worse and no better than those of prototype and conventional nuclear plants in other countries.

"When Douglas Point encountered difficulties there was a lot of wiping of brows and criticism mounted, even though the people vitally involved knew that one of the most complex and advanced single engineering projects ever undertaken in this country would necessarily experience difficulties before gearing up to full and steady production.

"Nonetheless, like all true pioneers who change our world, they kept the faith. The faith, in this case, is represented in what is known as the CANDU reactor, an acronym that stands for Canadian Deuterium Uranium.

"To the world, the significance of Pickering and the CANDU system lies in its ability to use natural uranium fuel, with lower fuelling costs than any other reactor available on the market today," Mr. Davis said.

Federal Energy, Mines and Resources Minister Donald S. Macdonald said the opening of Pickering meant that Canadians are passing a significant milestone on the road to optimum use of technology and resources for a better life.

"Canada has pioneered in this work since the closing days of the Second World War

when the federal government became involved in what is the greatest breakthrough in energy production that man has known.

"There have been disappointments, discouragement, and the defeatist cries of some of the critics, but this plant's performance are dramatic evidence of genius, perseverance, and confidence.

"Canada has come a long way since the days of the federal beginning in the field, and there is still a long, long way to go.

"Pickering, when in full operation, will supply enough power for nearly two million homes. And this will be made-in-Canada power which is not dependent upon importation of other fuels. Pickering represents the world's largest practical application of our new technology.

"It is a time-worn phrase that the world is only on the threshold of the nuclear age, true though this may be — but we should never stop reminding the international community that Canada has its foot inside the door," Mr. Macdonald said.

AECL president J. Lorne Gray said the outstanding features of the Can



Left to right: Ontario Hydro Chairman Douglas Munn, AECL Chairman J. Lewis, Prime Minister Joe Clark, and Ontario Energy Minister Michael R. Martin. They are at the Pickering plant, looking at a model of the reactor. In the background, from left to right, are: Ontario Hydro Vice-President J. A. G. Carr and AECL Vice-President J. A. G. Carr.

Nuclear power program was the very close and friendly collaboration between the public utilities and AECL, the government agency responsible for the basic development of atomic energy. "Gentilly, in Quebec, and the nuclear power units here in Ontario have benefited greatly from this close working relationship that started with the introduction of power reactors in Canada and has flourished ever since.

"Pickering has been outstandingly successful so far, and, although we can expect difficulties from time to time, we know they will be manageable.

"All of the nuclear power projects in Canada have not started as auspiciously as Pickering, but all were necessary and they have contributed in no small measure to the success of this plant.

"NPD has performed well and is now an ideal training unit for nuclear plant operators. Douglas Point, though operating well now, has certainly had its rough spots. However, the experience we have all gained — suppliers, designers, operators, constructors and our R and D staffs — is paying off in this plant and will pay off more at Bruce and at other plants to be built elsewhere in Canada.

"The Gentilly plant is one of the essential steps as we develop the CANDU line of reactors. We are learning much as this plant is taken through the various stages, necessary in a prototype unit, from first power to full power," Mr. Gray said.

Ontario Hydro Chairman George Gathercole said pioneering work of this nature seldom achieves success without an element of risk. "And frequently the most ardent critics were ourselves — AECL and Ontario Hydro — who have developed as a team this Canadian approach to nuclear power. We were concerned about the early performance of Canada's first commercial-size nuclear plant at Douglas Point. In retrospect, it is evident that people expected too much from an untried prototype plant. But it is equally evident that it was an essential step in the evolution of our nuclear power program.

"We have learned much from Douglas Point and we have also gained much from having been our own vigorous critics. We have not been complacent.

"As we approached the start-up of the first unit at Pickering, which we regarded as a critical test, we decided that rather than engage in a battle of words in our

defence we would allow the performance of Pickering to speak for itself. It has spoken, emphatically and with conviction. Our best expectations have been exceeded.

"The first reactor was started up February 25, 1971, just 5½ years after construction commenced. It then progressed to full power production in about three months, nearly one month less than scheduled. The second unit was started up last September 15 and reached full power in less than two months. Considering the lengthy shake-down period normally required for large thermal units of any sort, let alone nuclear, such performance is remarkable.

"On-power refuelling, which is one of the outstanding attributes of Canadian nuclear reactors, has already been successfully achieved with the first unit.

"Both units have been operating at an impressively high average capacity factor of 80 per cent and to date have generated more than four billion kilowatt-hours of electricity. To produce this much electricity at a coal-fired station would have required the burning of about 1.3 millions tons of coal costing over \$14 million.

"The performance of Pickering is a tribute

to the scientific knowledge, ingenuity, perseverance of AECL's and Ontario Hydro engineering and design staff, and to skilled construction workers and operators. It is also a tribute to the capability of the manufacturers who fabricated both the nuclear and conventional components, many of which were of new design.

"What of the future of Pickering and the Canadian nuclear program? There will be problems as there have been in the past. There will be outages. The race has not been run, it has just begun. We have not yet had sufficient experience to provide a conclusive guide to the future. We know our fuel costs are exceedingly low, however, water leakages, a troublesome matter at Douglas Point, are less than expected. But we do not yet have all the answers.

"What we do know is this. We have a reactor which has many technical advantages, an outstanding safety record and extraordinary safety features, and an immense potential for further development — a reactor which at this moment in time stands among the world leaders and offers every promise of retaining that position in the evolution of nuclear power continuing. Mr. Gathercole said. □

news hounds galore



Anti-climactic by nature, official openings present a not-to-be-lost opportunity for public recognition, sealed with a stamp of approval no less imposing than the stature of the participating dignitaries.

The official opening of Pickering was no exception. Falling conveniently midway between the start-up of its first two 540,000-kilowatt units and the commissioning of units three and four, the occasion provided a veritable cornucopia of publicity.

A week before the event, the Toronto Star devoted a full page of photographs and text while the Windsor Star followed suit on

opening day. Neither were the hallowed columns of the New York Times inviolate, the Pickering story getting front page treatment in the financial section.

Come opening day, the normally uncluttered floor of the turbine hall had blossomed into a forest of microphones, floodlights and snake-like cables that threatened to ensnare the feet of the unwary. The milling press corps included three representatives from the Toronto Star. The Globe and Mail fielded two.

Apart from local television stations together with the CBC and CTV networks, international interest was reflected by the

presence of TV cameramen from Britain and Detroit.

Many of Ontario's 250 or so week newspapers carried stories farmed to them while the editors of prestigious nuclear trade magazines in Britain and Europe filed requests for material.

Indeed, the world's eyes were on Pickering with its uniquely Canadian natural uranium heavy water reactor system. As Ontario Premier William Davis pointed out in his opening remarks, the half-operational station had recently put out more power than any other nuclear plant in the world.

That fact alone was worth shouting

North of Moosonee, they talk by
radio telephone and haul freight
by tractor train over the frozen,
wind-swept surface of James Bay.
Now Hydro and a handful of priests
are introducing electric power to
that desolate land.

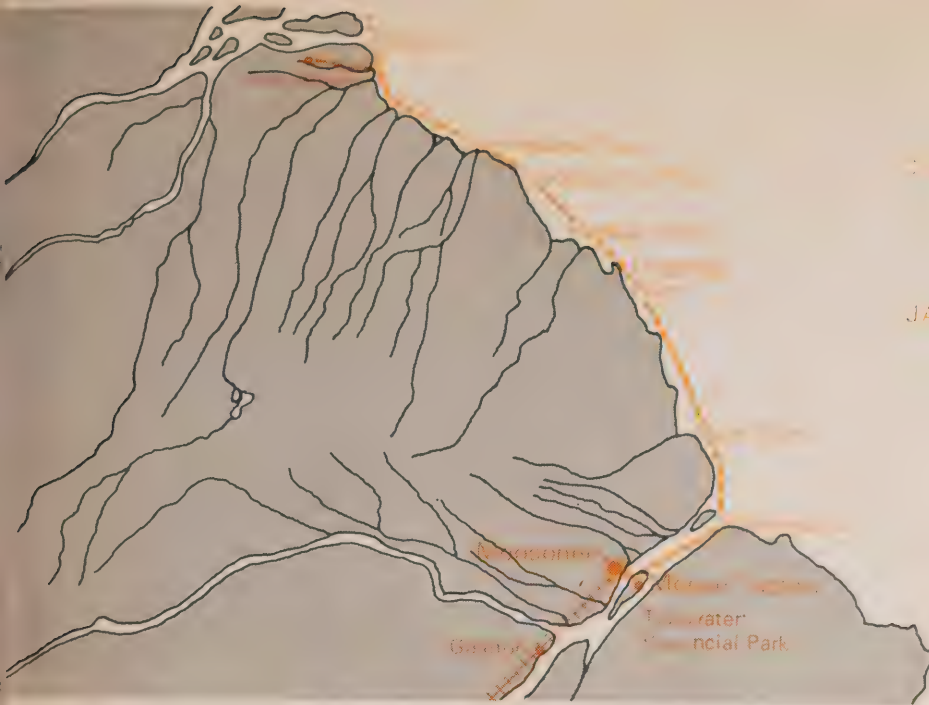
end of the line

by Rex Hopkins





Members of Ontario Hydro's "Ice
Committee" — who will be pulling
the ice from the lake during the winter
to keep the waterway open for shipping
and recreation. From left to right: Mike
Quinn, Dave Ray, Les Brown, and
John Brown. Photo by John Brown.



JAMES BAY

1000 ft. above 1000 ft. mean sea level
 1000 ft. above 1000 ft. mean sea level
 1000 ft. above 1000 ft. mean sea level

Outside it's sunny and cold — very cold. The skies are a brilliant blue and the temperature's around 25 below zero. The wind is from the northeast, coming in off James Bay, gusting to around 40 miles an hour at times, and raw. The glare of the sun against the six-foot snow mounds is blinding.

Inside, it is comfortably warm. The electric heater is plugged in. It always is.

The whiskered, 84-year-old Lorne Saunders sits in the sitting room in the Oblate Mission at Moosonee. His peak is at a jaunty angle and his woollen overcoat is unzipped. He looks something like Santa Claus in civvies.

He's predicting a storm within the next couple of days and wonders aloud to anyone within earshot if "that tractor train has left Albany yet."

That's the talk of the town up here where snowmobiles, some with sleighs for hauling supplies from the Hudson's Bay store, or Indian children to and fro, are as commonplace as automobiles in suburbia.

The "train" is headed from the mission at Fort Albany, about 100 miles to the north, and the ice has been late in forming this winter. It's a matter of grave concern to the people of Moosonee. For any heavy freight must be hauled during the winter months over the frozen surface of James Bay.

The Oblates, a Roman Catholic order of priests, first started operating tractor trains with small two-ton tractors back in 1934 to deliver supplies to their missions dotted along the coast as far north as Fort George. In 1959 they acquired 16-ton tractors, and started hauling for others as well as themselves.

Part of the cargo on the return trek north will be 52 wood poles for Ontario Hydro. They range in length from 70 to 100 feet and will be used in a nine-mile distribution line from Fort Albany to Kashechewan, bringing electricity to families in both Indian settlements, many of them for the first time.



The power is being purchased from the Oblates' Fort Albany diesel plant by Hydro and sold to the residents of the two communities.

There won't be much, but sufficient to give illumination to replace the coal oil lamps, and to operate small appliances such as toasters, irons, kettles and refrigeration for the moose and caribou meat. Even the odd television set may make its appearance.

Ontario Hydro's involvement in places like Fort Albany stems from a program developed in co-operation with the Department of Indian Affairs and Northern Development and other government agencies. Fort Albany and Kashechewan are the first communities to benefit. But there will be others — lots of them — like Martin Falls, Big Trout Lake, Pikangikum, Sachigo Lake, Sandy Lake, Round Lake, Kassabonika, Wunnumin, Deer Lake, Attawapiskat, Winisk, Lansdowne House and Webique.

Conditions of supply will differ vastly in these remote communities from those which apply to the rest of the province. In most locations small diesel generators will be installed and the rates charged will have to cover all operating and maintenance costs.

While Ontario Hydro will assume responsibility for the operation and maintenance of these mini-systems, the money required for building and extending the systems will come from outside sources. The money to

build the Fort Albany-Kashechewan line is coming from the Indian Affairs department, for example.

Day-to-day operation will be the responsibility of local residents, although the systems will be administered by Hydro's two northern regions. Personnel from northeastern and northwestern regions will train the Indians in the operation and maintenance of diesel plants and teach them a limited amount of line maintenance. In addition, it will be up to the Indians to read the meters and collect the bills.

Conditions make the power line a tough job of maintenance for Ontario Hydro's men in the north. After getting reports from remote communities, the department's Indian Affairs team will be called in to help. The team will be led by a member of the Ontario Hydro's Northern Region.

While the Oblates' tractor train is headed south, an Ontario Hydro one leaves Moosonee loaded down with line hardware for the job. It's mid-afternoon and the wind's getting up. Before long it will gust up to 60 miles an hour and snow conditions are poor for traction. The nine-ton lead tractor is bogged down — it's time for

Lineman Jim Quinn, one of five members of the train crew, drapes a large tarp between the rear sleigh of the first unit and the tractor of the second as a wind shield. He lights a propane torch and





ends an empty juice can with a wire
ring through the top over a long pole
coops a few handfuls of snow into the
The crew remove their fleece-lined
is and rub their hands briskly together
the open flame and steaming "kettle"
d their fingers of the numbness

advance party of Hydro people is
dy billeted on the second floor of a
age at the Fort Albany mission. There's
in on their door — Stalag 17 — and
ve been there about a week to stake

the line, which must cross the seven-
and-a-half mile wide tidal Albany River
Their work is almost finished now. They're
just waiting for the hardware and the poles

Forty-foot poles are already in place in
both villages. They've been fashioned from
local timber by the Indians, who erected
them, too. It will take about two months
to build the 2,400-volt line

It's the end of the line up here in Moosonee,
in more ways than one. The Ontario
Northland Railway's "Polar Bear Express"
terminates here. So does telephone service.

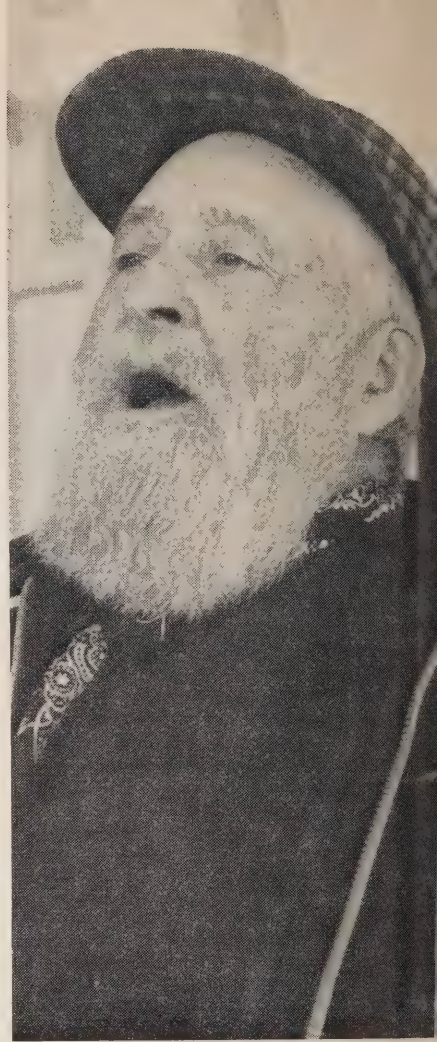
From here north, communications are
by radio telephone

But for the Oblates, and the Indians, it's
a way of life. Father Joseph Baril, who's
lived in the James Bay area for two decades,
looks more at home in a hooded snow-
mobile suit and a toque than he does in
a clerical collar. He points out that life in
Fort Albany, only 100 air miles north of
Moosonee, is much different

"They don't have three trains a week up
there like we do down here. Until last year,
the biggest airplane they ever saw was



Forty-foot poles, fashioned from local timber by the Indians, are in place in both villages. A long-time northerner, 84-year-old Lorne Saunders expresses concern over the whereabouts of the Oblate Fathers' tractor train, but his anxieties are relieved with the arrival of Brother Oliver Charpentier, at wheel of snowmobile, and Brother Ernest Beaudoin at the Oblates' Moosonee mission.



an Otter or a Beaver. Now a DC-3 lands there two or three times a week. To the natives, it's like seeing a 747 come down at Toronto International Airport."

It's thanks to the Oblates that the DC-3 can now land at Fort Albany. They completed a 3,000-foot airstrip for the Department of Transport late last fall.

Doing contract work for others is part of the story of the Roman Catholic Diocese of Moosonee. There's little or nothing the Oblates won't or can't do anywhere in the "parish" that stretches 900 miles from east to west and 600 miles from north to south.

It was back in 1847 that the first Oblate missionary paid a visit to what is now Moosonee. They established a mission at Fort Albany in 1892 to bring education and medical assistance to the Indians.

Now they operate 10 missions along the James Bay coast, and they visit and work with the Indians in a like number of settlements.

Until two years ago the 15 priests and 20 brothers, headed by Bishop Jules Leguerrier, operated the residential school at Fort Albany and hospitals there, in Moosonee, and Attawapiskat. The Department of Indian Affairs has taken over the Fort Albany school, and the Moosonee hospital has burned down.

They still operate the Fort Albany hospital, the Attawapiskat hospital and a school in Fort George, on the Quebec side of James Bay. They hope to rebuild the Moosonee hospital soon.

The residential school at Fort Albany is a three-storey concrete block structure. The blocks were manufactured right on location with bagged cement that arrived via tractor train and gravel that was mined

and processed from the bottom of the Albany by the Oblates. The saw mills still standing from which they fashion the local-cut timbers.

The Brothers built the sawmills, too. Father Baril says they're full-fledged Oblates, but haven't opted for the priesthood. Rather, they've taken trade training after completion of their religious training. There are carpenters, electricians, seecaptains, power station operators, and a host of other skilled tradesmen in the midst.

The Oblates operate the diesel generating plant at Fort Albany, which was acquired from the Department of National Defence when the mid-Canada radar line was phased out in 1965. It's from here that electrical service will be provided for two Indian settlements.

Brother Oliver Charpentier is the ma



ge of the tractor train. He's been with
for more years than he cares to admit,
the job's no sinecure.

the train's initial trip, he drives ahead
snow vehicle dragging a winged
to map out a road over the frozen
ice of James Bay. The train will follow
s tracks, but on subsequent journeys
takes his turn at the wheel along with
six other tractor drivers and three
on crewmen. They normally have 15
hs in tow, three of them box sleighs
a caboose which doubles as dining
and bunk house.

run 24 hours a day stopping only for
es, to grease and fuel the tractors and
offee at 10 in the morning and three in
afternoon. They haul anything from
ulling materials for their missions to
ols for Ontario Hydro and perishable
ods for anyone.


The main problem faced by northern
workers, says Father Baril, is in teaching the
Indians to adapt to a new pattern of life,
a pattern being offered to them not only by
the Oblates but through the ultra-modern
Moosonee Education Centre, which
combines a separate school, a public
school and vocational school facilities.

"We can teach them trades, we can
give them a high school education — but
when the hunting season, or the fishing
season, or the trapping season arrives, the
Indians' first love comes first," says Father
Baril.

Things have changed drastically since
he first set foot in Moosonee. And they're
still changing. The day may be just around
the corner when the managers of Hudson's
Bay outposts may even have to move the
coal oil lamps off the shelves to make
room for light bulbs



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*on of
rsts*

First parliament, first printing press,
first newspaper, first public library,
first act to abolish slavery, first
masonic lodge ... now Niagara-on-the-Lake
is beginning to look increasingly like
its former self.



Fine examples of Georgian architecture grace Niagara-on-the-Lake, including 150-year-old St. Andrew's Church and vine-covered cottages. The house in which Shaw Festival was founded, the Slave's cottage, lower right, has been restored. New street lamps on decorative wooden poles and new street lamps on decorative wooden poles enhance the town's colonial atmosphere.

Its streets are wide and many of the houses are either flat white clapboard or stucco trimmed in black. There are a few brilliant yellow ones, too.

The town clock, which doubles as a cenotaph, stands like a sentinel in the middle of the road at one end of the main street. And the shops and boutiques look like something out of the colonial era in this quaint community at the mouth of the Niagara River.

In fact, Niagara-on-the-Lake, the town in which a great deal of Canada's history was written, is a near perfect example of Georgian architecture.

Apart from being the site of Upper Canada's first parliament in 1791, Niagara-on-the-Lake is a town of firsts. The first Masonic lodge in Upper Canada was established here, the first printing press was set in motion here, and the first newspaper, The Upper Canada Gazette, was published here.

It was here that the first brick building in the province was erected in 1795 and, in 1800, that the province's first public library opened its doors. The first act to abolish slavery was passed in Niagara-on-the-Lake and legislation prohibiting the flogging of women was enacted here, too.

In the early years, Niagara-on-the-Lake figured prominently as a military centre — the town was laid out by British army engineers in 1792. When the British evacuated Fort Niagara on the U.S. side in 1796, Fort George was built and the town became the principal British military establishment of the western frontier.

It was also important commercially in the early 19th century. In 1810, there were six taverns and 20 dry goods stores, and there were schools galore including boarding schools, ladies' and dames' schools, night schools and schools for colored children, the offspring of slaves who had escaped the deep south in search of a better way of life.

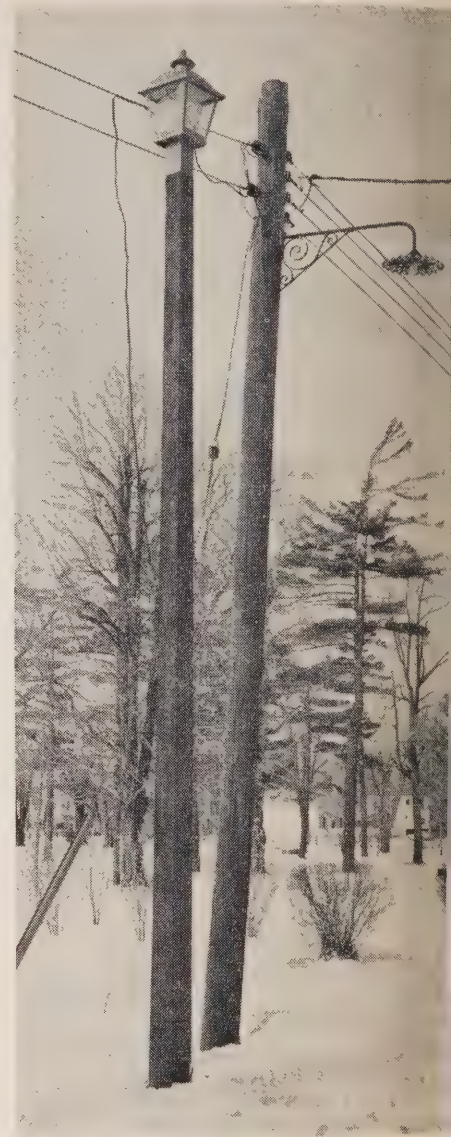
Then came the war of 1812. On December 5, 1813, retreating American forces burned the entire town to the ground. Barely a home was left standing and the shells of a few brick buildings around town were all that remained of the once thriving community.

Three years passed before reconstruction got underway.

Now, more than a century-and-a-half later, restoration is the "in thing" in Niagara-on-the-Lake.

Oddly enough, the town's name only became official with the regionalization of Niagara a little over a year ago. Before that, the legal name was the Town of Niagara and "Niagara-on-the-Lake" was merely a convenient way of distinguishing the town from Niagara Falls.

Niagara-on-the-Lake's restoration is no haphazard affair. There's a campaign, for example, to persuade local merchants to put up scroll-type signs to advertise their wares. To ensure the town retains its link with the past, the planning board has even provided merchants with a standard pattern for signs, complete with a uniform typeface.



Even the streetlights have taken on the appearance of yesteryear in keeping with Niagara-on-the-Lake's colonial atmosphere. Wood poles, bandshaved to the tapered, square-based shape and bored through the middle to accommodate cabling from underground to the old-fashioned square copper fixtures are being installed in the core area.

Niagara Hydro manager John Dawson says the fixtures are replicas of those adorning certain streetlights in London, England. "Of course," he adds, "they're complete with the most modern optics available — metal halide lamps and the



uses are of shatterproof plastic so that
 tiles, and stones, will go right through
 without shattering them."

Though it doesn't believe in legislation
 to force merchants into arbitrary patterns,
 the town's planning board has suggested a
 colonial atmosphere for the whole down-
 town area.

One of the outstanding downtown restora-
 tions is the Niagara Apothecary, an
 authentic reproduction of the pharmacy
 which first opened its doors in 1866.

Designed as the only Confederation-period
 building (interior and exterior) in the town,

the shop with its fixtures of butternut and
 walnut has survived almost unchanged.
 Many of the original bottles and containers
 have been returned to the shelves in this
 drugstore-turned-museum. Elaborate
 plaster-relief rosettes decorate the ceiling
 from which hang replicas of the crystal
 gasoliers that once added charm and
 elegance to the interior

But the restoration goes much further
 than the downtown area. Many early homes
 have been, or are being, restored to their
 original state with one important exception
 - the convenience of electrical living

Take, for example, the Butler house, said
 to have belonged to a relative of Col. John
 Butler, head of Butler's Rangers. The
 chair rails will still surround the living and
 dining room walls, and the beehive oven
 and cooking fireplace have been rebuilt.
 But there's also an ultra-modern electric
 kitchen concealed under the basement
 stairwell.

Yet another loss of authenticity will be
 the use of a heat pump to provide heating
 and air-conditioning. And while the
 up-to-date lighting will be a far cry from
 the candles and whale oil lamps that once
 lighted the rooms, the home will retain
 all the charm of the Georgian era.

New white pine clapboard will be added
 to the vertical sycamore and buttonwood
 planking that formed its original frame.
 The board will be held in place by hand-
 wrought nails, similar to those fashioned in
 a local blacksmith's shop more than 150
 years ago.

Then there's the Richardson-Kiely house,
 a colonial mansion overlooking the town's
 golf course. Commonly called the "big
 house," it was built in 1832 and has since
 been restored.

Here, too, modern electrical conveniences
 are in sharp contrast to the large crane-
 equipped cooking fireplace in the drawing
 room. (It even has a musket leaning against
 the oven door.)

W. Sam Jennings, Niagara Hydro's chair-
 man and former president of District 5 of
 the Ontario Municipal Electric Association,
 is an active advocate of preserving the
 town's old buildings.

And there's the slave's cottage on Gate
 Street - a tiny house with tiny rooms that
 provided shelter for the blacks of the big
 house. The list, in fact, goes on and on.

"Six or seven of them have gone all-
 electric," says Mr. Dawson. "It's only
 natural that they should. You don't have to
 tear the place apart to install electric
 heating and the system can be easily
 concealed. You can put in cable heating
 where you can't put in air ducts. The old
 houses are all angles, you know."

It somehow seems fitting that the town
 should be the only one in the nation with
 a Lord Mayor (he's Frank Goring) at the
 head of its council and even more fitting
 that just over 10 years ago the Shaw
 Festival was started here.

Close to 200,000 tourists a year visit the
 quaint town. About 10 per cent of them see
 Shaw's works performed in the vine-
 covered Court House Theatre on Main
 Street. The others? Well, they're there to
 take a brief stroll through Canadiana

CONVENTION TIME

The future of utilities, power costing, debt retirement policy, equity and environmental concerns came in for close scrutiny at the 63rd annual OMEA-AMEU meeting

Muncaster sees fewer utilities



J. D. Muncaster . . . task force view

The number of electric utilities in Ontario should be reduced, says J. D. Muncaster, chairman of the Task Force Hydro steering committee.

Speaking at the closing luncheon, Mr. Muncaster, president of Canadian Tire Corporation, gave the first indications of the approach the task force will take in formulating recommendations that will result from a year-long study.

"To date, we have not been convinced of the need for radical change in the role of the utilities within the system. We have, however, been impressed by the necessity for some rationalization involving a reduction in the total number of utilities," Mr. Muncaster said.

He stressed that it was still too early to define clearly any emerging new role for the municipal utilities.

"We have, however, made some observations. We appreciate the unique contribution by the utilities in the development of the

Hydro family in Ontario. We are conscious of the importance of preserving the forces imposed by municipal utilities which protect the consumer at the local level and which provide an opportunity for citizen involvement in this most important publicly-owned enterprise."

Mr. Muncaster said the task force believes the total system, including Ontario Hydro and the utilities, must become increasingly responsive to various areas of public policy.

He said the task force is considering mechanisms which will ensure an electrical generation and distribution system responsible to government policy encompassing a much broader range of issues than has formally been recognized in the past.

"From the government side, the challenge is to articulate policy based on a wide range of interdependent and often contradictory issues. Such policy must be consistent and implementable to the degree necessary for the effective and efficient operation of the system free from day-to-day interference or intervention."

Mr. Muncaster told delegates that Ontario had enjoyed a publicly-owned electric utility with an enviable reputation throughout Canada and abroad. He attributed this to the OMEA, the AMEU and Ontario Hydro.

On the question of costs, the task force chairman said rates in total must cover costs in total.

"And costs, in a 1972 context, are not only the true long-run marginal costs of generating and transmitting electric power — all relevant social costs, such as those environmental costs which, no matter what technology is chosen, will always be associated with the generation and transmission of power," he said.

"If the aggregate rate level is set higher than this long-run marginal social cost, demand for electric power, and hence output, will be restricted. An aggregate level set below this point would have an opposite effect."

He said neutral aggregate rate levels would require inclusion of the cost to the province of bearing the risk of Hydro bonds, environmental considerations, provision of power below long-run marginal social costs such as service to remote areas, along with a provision for the stimulation of regional development, stabilization of employment and other government programs not required by private sector enterprises.

"Quite aside from the question of owners and income taxes, however, the evidence is that because of such considerations as the government guarantee of its debt, and its failure to include in the cost of power all environmental costs, over the years Hydro has sold power somewhat below the long-run marginal costs."

In addition to aggregate costs, Mr. Muncaster said, the task force had identified other areas which could be considered relevant to the role of Hydro in Ontario as an instrument of government.

These include rate of return on capital invested, price stability, capital investment timing, stability of capital markets, energy policy, discriminatory pricing, environmental policy and cost effectiveness.

"All of these issues are of primary concern to government and to a greater or lesser degree may bear directly on the future operations of publicly-owned utility systems," Mr. Muncaster said. □

'Road to financial ruin'

The OMEA has gone on record as strongly opposing delays in increasing the wholesale cost of power to PUCs by withdrawing funds from the rates stabilization fund

R. W. Howarth, Niagara-on-the-Lake said the policy of deferring rate increases "would postpone and make more bitter the day of financial reckoning."



W. S. Jennings . . . pay-as-you-go advocate

W. S. Jennings, Niagara-on-the-Lake, gave strong support to the pay-as-you-go principle.

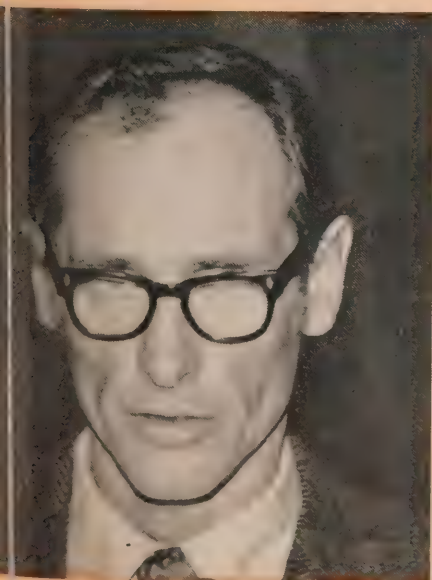
Any delay in recovering the cost of power might have been politically expedient, but it is the road to financial ruin," he said.

However, Anthony Green, Oakville, who opposed the resolution, said he favored ongoing interim rate increases in July, as will be the case this year. He said commissioners felt more comfortable about announcing rate increases in November when they were up for election.

R. H. Hay, Kingston, urged the OMEA to be fair and recognize that PUCs have benefited substantially from withdrawals from the fund in recent years. Withdrawals have been used to cushion rate increases.

They have benefited from it to the tune of millions of dollars in the last few years," he said.

A second resolution dealing with the rate



Anthony Green . . . favours July increases

stabilization fund was defeated. It urged Ontario Hydro not to impose any cost increase on municipal utilities in 1972.

Archie McGugan, resolutions committee chairman, said the resolution was "redundant" since an interim rate increase had been announced for July 1. □

Credit union for utilities under study

The OMEA has decided to launch studies into a multi-million dollar "utilities credit union" to assist in their short-term financing and a co-operative contingency fund to cope with natural disasters.

Delegates passed a District 1 resolution calling for consideration of setting up a professionally-managed fund in which a utility could invest money or borrow working funds within the Hydro organization, and at more attractive rates than are now possible.

Another resolution suggested the study of a contingency fund to assist utilities which suffer extensive damage in natural disasters. This was endorsed after Ted Dash, of Sudbury, said Sudbury PUC had to pay \$150,000 in storm damage after a tornado struck a community served by his utility.

The resolution suggested that the fund could be financed through the cost of power, "or through some other equitable manner of assessment."

A third resolution involving financing called for study of a less cumbersome method of borrowing by municipal utilities. The District 2 resolution, passed without discussion, said the present method of debenture borrowing requires approval by the municipal council, Ontario Hydro and the Ontario Municipal Board and termed it "very slow and frustrating."

A resolution involving regional government was approved. Delegates urged the Ontario government to require regional councils to refund to a municipal utility on a yearly basis any surplus of interest earned over and above the guaranteed interest on utility sinking fund debentures.

H. R. J. McDonald, chairman of Nepean Township Hydro, said failure of a regional council to return such surplus interest meant that the utility lost the use of the money for the term of the debentures. He said such funds could be invested by the utility to earn a higher rate of interest than that paid by sinking funds.

Turning to underground wiring, delegates passed an amended resolution calling for

legislation to give utilities authority to require customers to rearrange their wiring and bear the costs when a utility changes its method of supplying service.

R. J. Sinclair, of Peterborough, cited a case in which two customers refused to change their wiring to connect with a new underground line and threatened legal action if power from an overhead line was disconnected.

M. L. Whelpton, of Windsor, opposed the move on the grounds that such costs "must be borne by all customers." Anthony Green, of Oakville, said his utility now pays all costs connected with underground, but was looking for alternative methods of financing.

At the suggestion of the resolutions committee, delegates deleted a clause which would have such decisions made subject to appeal through municipal councils.



M. L. Whelpton . . . urges cost sharing

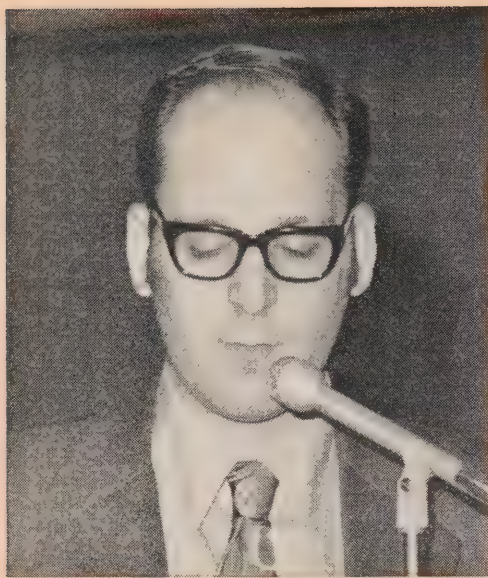
The OMEA resolutions committee received a strong vote of confidence when a resolution urging the committee to refrain from making recommendations for or against adoption of convention resolutions was heavily defeated.

Archie McGugan, of Palmerston, chairman of the resolutions committee, said the OMEA constitution gave the committee authority to protect the association against "ill-advised" resolutions and to suggest rewording. He said the committee includes the presidents of the nine OMEA districts and "we think that we help to guide the OMEA in making decisions."

W. S. Jennings, of Niagara-on-the-Lake, said he appreciated the guidance of the resolutions committee. "This convention is no rubber stamp for anyone," he declared.

Delegates also :

- Urged that the safety problem created



R. J. Sinclair . . . tells of near disaster

by cladding old buildings with metal siding be referred to the Ontario Electrical League to ensure that building codes are adequate to provide protection against electrical fire hazards. R. J. Sinclair of Peterborough, said a "near disaster" occurred last year when a conductor touched a metal-clad home and fire broke out.

- Defeated a request that linemen retraining courses be rescheduled for small utilities when it was pointed out every effort is made to arrange convenient times.
- Approved an amended resolution asking the Ontario Municipal Employees' Retirement Board to permit purchase of improved pensions for PUC employees at least to the extent of 50 per cent of the costs borne by a municipal utility.
- Carried an amended resolution urging the Ontario Department of Labor code review committee to consider adoption of the national building code as the regulation covering insulation standards for electrically-heated homes in Ontario. Delegates deleted a clause calling for inspection of all residential construction by a single provincial regulatory body. □

Pay-as-you-go policy probed

Two far-reaching studies dealing with the "gut issues" of debt retirement policy and equity have been launched by OMEA delegates.

An overwhelming majority of OMEA delegates endorsed an intensive study of a proposal to meet a steadily increasing proportion of Ontario Hydro's annual capital requirements through a yearly charge in

the wholesale cost of power.

In another significant move, delegates approved a thorough study of the question of a municipal utility's equity in Ontario Hydro with the objective of removing any inequities that might exist under the present system.

The debt retirement plan, moved by W. S. McGregor and Dr. R. H. Hay, both of Kingston, was described by incoming president Archie McGugan as "a policy matter of extreme importance."

The resolution kicked off a wide-ranging debate in which nearly a score of delegates participated. Two amendments were accepted and a third was rejected.

In its final form, the resolution said:

"Resolved that Ontario Hydro be requested to submit a proposal to the OMEA whereby a steadily increasing proportion of the annual debt requirements of the Ontario Hydro system is met by a direct charge in the annual cost of power, so that in a period of not less than 10 and not more than 25 years the whole of the annual capital requirements are met by such a charge as a component of the annual cost of power and the debt on the system is stabilized and its growth halted."

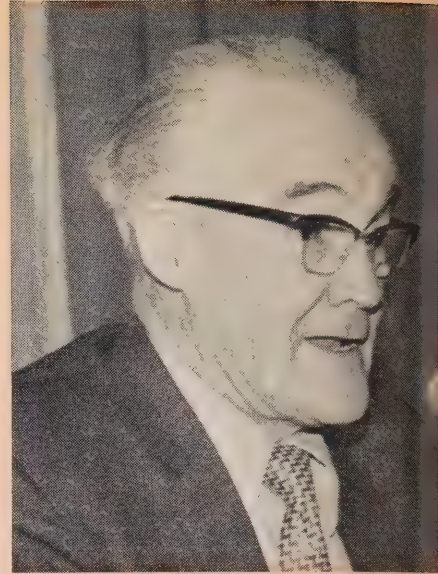
H. T. Ross, Sarnia, opposed the resolution and suggested that Ontario Hydro be allowed to arrange its own financing. "This resolution means at the very least that rates to consumers will be doubled," he said.

Mr. Ross said that a proportion of Ontario Hydro's annual capital requirements is already being met through a charge in the wholesale cost of power. He said that the people who benefit from a station such as the 3,200,000-kilowatt Bruce project should pay for it rather than the present consumers of power.

Mr. Ross expressed fear that Ontario Hydro would be discredited in the eyes of the public if retail rates were forced up. He said Ontario Hydro had made no secret of the fact that rates will increase in the next few years because of rising costs. "That's all we can handle," he said, saying that Ontario Hydro was doing an "excellent job of financing."

R. R. Wells, Oakville, said utilities will be relieved of the frequency standardization charge in 1975. "If this proposal is approved," he said, "we will face additional costs in 1975. There is no way this body should approve it."

L. L. Coulter, Ottawa, said he thought the plan "most desirable," but he warned there were inherent dangers. "We may be pricing ourselves into a position which our oil and gas competitors could take advantage of."



Dr. R. H. Hay . . . would reduce

Mr. Coulter said he felt that for this reason the proposal will require "continuing a continual study."

Mayor L. E. Cook, Barrie, said he saw a great deal of merit in the proposal but "my concern is that the disadvantages outweigh the advantages as I see them. He expressed concern about the effect of rate increases on people who live on fixed incomes.

A. J. Bowker, Gloucester Township, said the present system of debt retirement might have been appropriate when interest rates were 4 per cent. But with high rates a new method of debt retirement should be studied.

Anthony Green, Oakville, who proposed an amendment which was later accepted calling for submission of the debt retirement proposal to the OMEA, said he was worried about "the tremendous debt hanging over our heads."

J. R. Dunn, North York, said the cost of power was going to increase no matter what happened to the resolution. He said the choice was between putting up with it now or in 10 years "you will be paying the equivalent in interest."

Mr. Dunn cited an example of a utility which borrowed \$1 million for 30 years. He said that in 10 years the utility would be paying \$1 million a year in interest charges on the loan.

An attempt by Mr. Dunn to amend the resolution to provide for the "elimination of equity" was defeated.

Questioned by Mr. Dunn, about equity Dr. Hay said "in my view . . . the accumulation of equity would be at a much greater rate." He believed that utilities would arrive at a point where they would realize that "return on equity" was "silly and absurd" and they would be close to

...nce point between "cost of return" and "turn on equity."

...ore the vote was taken, Dr. Hay rose to express concern about the "high cost of equity." He warned that because of the "dup in debt Hydro may be "on a downhill slope, well-greased."

Dr. Hay said the matter was "a very real worry to people outside our organization" and warned that "it may lead to restrictions and limitations on our freedom of action."

...urged adoption of the resolution so that a study can be carried out this year and a report presented to next year's convention.

...ier, delegates carried a resolution calling for a study of the existing method of billing "return on equity" and "cost of return" with a view to removing any inequities that might exist under the present system.

Dr. Hay said he agreed that a study of the billing system should be undertaken. "I think that we need to review this (method) and from it will come changes that will make everybody happy."

Delegates also endorsed a District 1 resolution calling for a review of the present method of billing large industries to determine how disparity in rates between Ontario Hydro and municipal utilities may be eliminated.

G. B. Doherty, Oshawa, expressed concern about the disparity in rates between industries served by the municipal utilities and Ontario Hydro.

Windsor resolution that also said industrial rates appear to be discriminatory was referred to the OMEA board of directors for study. □

Want record of pollution battle costs

Ontario Hydro has been requested to supply information to utilities to help answer questions about the environment.

Delegates passed an amended District 1 resolution asking for an identifiable item in cost-of-power statements showing the charge required to cover the cost of research into methods of generating power, including improvements and development of new methods.

J. H. Hay, Kingston, said the information will be used to answer questions from ecologists and "people who are climbing the pollution bandwagon."

Dr. Hay said: "We do not in any way, shape or form intend to criticize Ontario Hydro." The figures would be used to answer critics.

A Windsor Utilities Commission resolution urging Ontario Hydro to sell power only to U.S. utilities which have "a satisfactory program of pollution abatement" was referred to the OMEA board of directors for study.

Eric Durance, Windsor, said his city is subjected to pollution from U.S. sources and asked for OMEA support for efforts to reduce pollution.

Mr. Durance said the Windsor resolution had gained support from the Windsor branch of Pollution Probe and the Windsor Star. □

A vital year - McGugan

Not since the birth of the public power movement in Ontario just after the turn of the century has there been a year as vital in the history of the OMEA as this year promises to be.

It could even see a fight for the survival of the municipal utility system in the province, says Archie McGugan, who at 69 takes over the reins of the presidential office.

Mr. McGugan was elected first vice-president in midyear by the OMEA's board of directors to fulfill the unexpired term of L. E. Danis, of Thunder Bay, who has been appointed an Ontario Hydro commissioner.

The retired Palmerston butter, eggs, and poultry man, who has sat on the town's



Archie McGugan . . . OMEA president

public utilities commission for two decades, sees 1972 as a year when every local Hydro commissioner "is going to have to go all out to let the people of this province know what the OMEA is, what it stands for, and how it works on their behalf."

He agrees the OMEA must not get to the stage where it does not want change. Nor should it accept change just for change's sake.

"There are just too many advocates of change who would prefer to see the local utilities shelved and Ontario Hydro become a department of government with total responsibility for electrical service in the province.

"But these people aren't aware that the whole business of Ontario Hydro's formation was done with the support and at the request of the municipalities. Nor are they aware that we're selling them power cheaper than they can get it almost anywhere in North America," says the silver-haired incoming president as he sits in his comfortable living-room amid his collection of Canadiana.

Mr. McGugan hopes that Task Force Hydro will support the municipal utilities in their bid to gain more recognition for their role in the distribution of electricity to the urban population of Ontario.

"Maybe," he says, "they will even settle the fight about who owns Ontario Hydro. We feel Hydro is owned by the municipalities. And it always has been, right from the beginning."

Regarding environmentalists and their complaints against Ontario Hydro, Mr. McGugan says: "We have every sympathy with them, but somewhere along the line we must establish our priorities.

"If Hydro does close down its thermal plants — what then?" he asks. "Another New York City — do they want brown-outs? I'd say not, and firmly believe it would be a sorry state of affairs if that day ever came in this province when we were forced to ration the selling of power to our consumers.

"That's the job of the OMEA in the coming year as I see it," Mr. McGugan says. "We must get our message across to the people of this province — and we must be convincing in our efforts to do it."

Mr. McGugan was born in Rodney and "went west" as an infant. After completing his early education in Vancouver, he returned to Ontario and the Ontario Agricultural College, in Guelph, where he earned a bachelor's degree in agriculture.

He worked as an agricultural representative for the Ontario Department of Agriculture in Essex and Peel Counties. During the early 1930's, he worked for a short time in the

automotive business, then as a fertilizer salesman. Mr. McGugan got into the poultry, egg and butter business with Canada Packers in Clinton in 1932, and remained with the company until 1936 when he bought a run-down creamery in Palmerston.

From there, he built up his business to become what he says was without any doubt "the plant that made the best butter in Ontario."

A decade ago he sold it to an employee who had worked for him for 20 years. □

Don White **Half his life** **in the job**

Half a lifetime in the electric utility business. That's the kind of experience behind 48-year-old Don White, manager of North York Hydro and newly-elected president of the AMEU.

It's also the kind of experience which will help him face a difficult year — a year in which the AMEU may well have to make a number of adjustments due to the forthcoming recommendations of Task Force Hydro.

One of Mr. White's major goals in 1972-73 will be to make the association ever more useful to its membership. "I would like to see a broadening of participation by the members. There are more than 250 active in the association now, but there's room for new blood and new ideas. Engineering has been our forte, but other aspects of the business are now receiving increased emphasis."

A more united approach to labor relations



... AMEU leader

by the utilities is also high on his agenda. "The AMEU services in this field have been expanded and will continue to grow as required," he says, noting that bargaining activities will be at a low ebb until fall and will peak next spring.

Continued emphasis will be placed on manpower training, particularly the lineman training program. "The utilities require about 80 linemen a year, and I'm pleased to say that we're able to train that many."

Mr. White's association with the AMEU goes back 15 years. He has served on most of its committees and has witnessed many changes during a rapid period of growth for electric utilities. His own utility, North York, has grown twelvefold in the 20 years he's been there. North York Hydro is now the second largest municipal utility in Ontario with 130,925 customers and a load of 572,000 kilowatts.

"Because of our growth we've been able to try new things," he says. "We were one of the first utilities to install underground wiring in new subdivisions. Now this is the rule rather than the exception across the province."

The utility has had to tackle some difficult jobs for customers, and has come up with some unique solutions. For instance, it was felt that the transformers being installed at the huge Fairview Mall indoor shopping plaza would take up too much valuable space. The problem was solved by putting them on the roof.

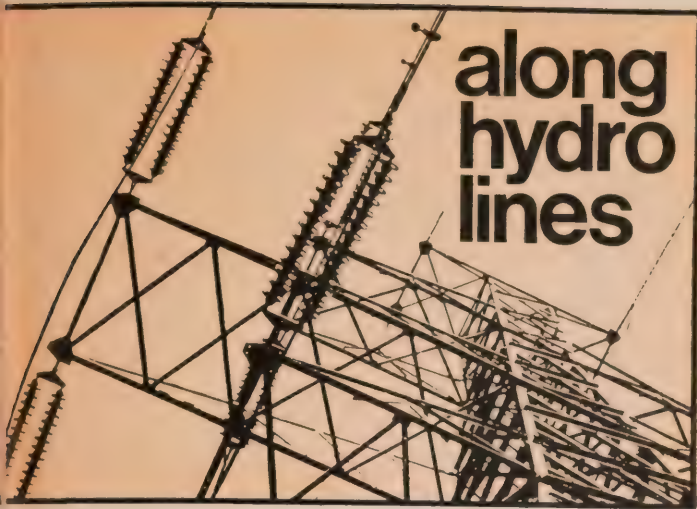
North York is at present tackling another major job providing electrical service for the TTC's Yonge Street subway extension.

Mr. White was born at Eldorado, near Madoc. He attended Cobalt High School and Queen's University. He graduated in 1946 with a B.Sc. and joined Ontario Hydro. Early in his career he became involved with the municipal utilities through Hydro's municipal department.

In 1948 he was appointed manager of Sutton area and in 1951 became consumer service superintendent in Hydro's central region. Less than a year later, he accepted a position with North York Hydro as assistant to the superintendent. Since then, he's held various senior positions culminating in his appointment as general manager in 1969.

Mr. White recalls that his decision to join the utility was prompted partly because he couldn't see himself as a commuter between his North York home and Ontario Hydro's downtown office.

"I calculated that by driving that distance every day for 25 years, I'd spend a year on the road just getting to and from work. That was too much." □



along hydro lines

Sales up despite cuts

Britain, the coal miners' strike, which plagued the electric utility industry in February and forced power cuts that affected millions, didn't deter consumers from purchasing major appliances. Sales at the electricity boards' shops held up and, in some instances, were higher than in the corresponding period a year earlier. There was speculation that after all power restrictions were removed, a further upsurge in appliance sales would result. □

Three N-plants

Detroit Edison plans to build three nuclear power plants in Michigan that could ultimately cost more than \$1 billion. The projects so far are committed only to preliminary engineering work and licensing. Final location of the units as well as operational dates will depend on several factors, including the results of engineering and environmental studies, future demands for electric power and the availability of funds. However, a tentative target of the early 1980's has been set. □

Shocks kill pain

Electromedicine may soon emerge as a major new approach to many diseases. So says the Wall Street Journal in a detailed article which hock treatment as a cure for ailments ranging from asthma and ulcers to insomnia.

The report states that a host of research projects, many of them on human patients, involves the application of electric signals to the nervous system in attempts to kill pain, put insomniacs to sleep and to relieve asthma, ulcers and high blood pressure.

The most dramatic advances in the field have thus far been made in "electroanalgesia," a method whereby light shocks to the spinal cord garble pain messages before they reach the brain somewhat like static on a radio.

Reports indicate that although tried only in extreme cases, electroanalgesia has already helped several hundred paraplegics, amputees and victims of incurable cancer. Its advocates say that unlike conventional treatment—surgery or massive doses of drugs—electroanalgesia avoids the risk of addiction, operates on a specific area. A person who shows signs of improving can simply turn it off.

Electrosleep therapy, where the patient wears electrodes on the sides of the neck and on the eyelids or forehead, is also beginning to emerge from the laboratory to the clinic. The electrodes are connected to a device about the size of a mantle radio which delivers low-level pulses. It is helpful in treating insomnia, anxiety

and depression with possible application to stomach ulcers and convalescence following surgery.

Debate over the merits of electricity as a medical tool continues in the U.S. with some officials of the Food and Drug Administration labelling it as ineffective and other scientists alleging that the FDA's position is out of date. □

Here come the electrics

By early summer, Scarborough PUC will have two electric vehicles on the road. Already, the utility is using a sporty yellow runabout to deliver mail between its Kingston Road headquarters, the municipal offices and its service centre. And according to manager T. J. Curtis, an electric van will be on the road by the end of June for use by the meter department.

The car, pictured here, was built by Vehicle Research Company of Scarborough, an automotive firm founded by four University of Toronto electrical engineering faculty members and headed by Professor Stuart Robertson.

Powered by 12 lead-acid batteries, the vehicle has an alternating current induction motor, a tubular steel space frame and fibreglass body. It made its appearance at the recent OMEA-AMEU convention.

Mr. Curtis says Scarborough PUC has agreed to operate the electric car for the research company and has also ordered a van to be equipped with an electrical operating system. If the experiment proves successful, other utility vehicles will be converted to electrical operation.

Developers of the vehicle say its big advantage is in reduced operating and maintenance costs over the internal combustion engine, which they estimate will be halved.

"A van travelling 10,000 miles annually could represent a maintenance cost-saving of \$250 a year," says Professor Robertson.

The van will be equipped with a 15 kva battery charger and 40 standard automotive batteries. Its range is estimated about 60 miles with a top speed of 50 miles an hour. □



... sporty runabout

D₂O now \$39

The U.S. Atomic Energy Commission has increased the price of heavy water from \$30 to \$39 a pound.

The AEC said the increase is due principally to increases in the price of coal to produce steam for heavy water production and also general escalation of other costs. Additional charges will continue to be made to customers for packaging and handling.

The \$39 figure also will become the base charge in determining the cost of leasing heavy water.

"In view of the limited U.S. production capacity for heavy water," said a news release, "the AEC has not undertaken to meet world-wide long-term requirements for this material as it has for enriched uranium.

"However, to the extent heavy water is available in excess of the needs of Commission-sponsored programs, the AEC supplies heavy water for peaceful purposes to domestic and overseas customers on a first-come, first-served basis."

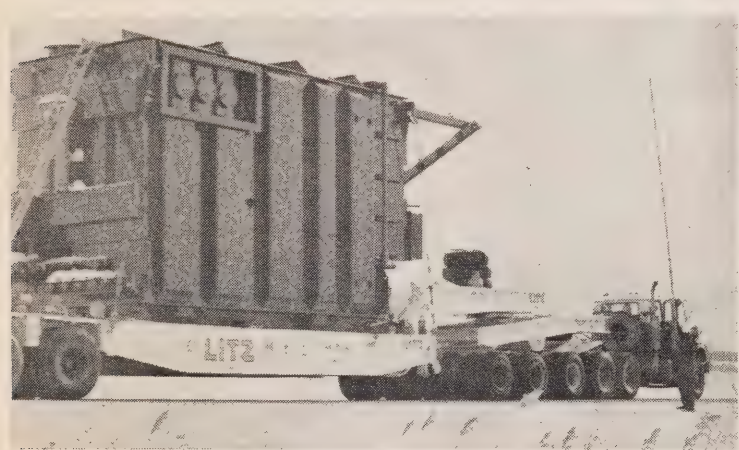
Atomic Energy of Canada Limited has acquired heavy water from the U.S. for use in Canadian reactors. □

Long, heavy load

Part of a connecting link between the Manitoba and Ontario Hydro transmission networks, this 200 mva transformer is on the last leg of its journey from Westinghouse Canada's plant in Hamilton to Manitoba Hydro's Whiteshell installation, 50 miles northwest of Kenora.

The 160-ton unit will be paired with a slightly smaller unit already on location. The latest unit will perform a phase-shifting function to control the flow of power while the other will match the voltages of the two systems.

Both units were transported to Lac du Bonnet, Man., by rail then transferred to a highway float for the final 30-mile trip to the station. Because of the equipment's weight, shipment had to be scheduled for the winter freeze-up period. □



... floating a new link

Not for the birds

A garbage disposal area near Toronto International Airport will be converted into a dumping ground for fly ash from Ontario Hydro coal-fired stations.

The federal transport department was worried that ordinary garbage would attract birds which, in turn, would be a hazard to low-flying aircraft. The dump site will eventually be landscaped.

How fast Niagara?

Ontario Hydro and the Power Authority of the State of New York are to take highly accurate flow readings of the Niagara River from a cable car strung 25 feet above the water.

Engineers will ride the car to the centre of the river and dangle a propeller-operated meter into the water. It is hoped the measurements will be suitable for calibrating a standard by which to estimate river flows.

The measurements are to ensure the two power utilities are complying with the international treaty which stipulates about 100,000 cubic feet of water must flow over Niagara Falls during prime tourist hours and not less than 50,000 at other times. □

Look, no steam

A thermionic reactor which converts nuclear energy directly into electric power has been developed in the Soviet Union. Such a system could conceivably by-pass the traditional use of heat to produce steam in present thermal plants.

Russian officials say comprehensive tests have been completed on a thermionic converter with an electrical capacity of several kilowatts. It subjects a selected metallic or semimetallic cathode material to very high temperature. Electrons are boiled off the emitter and captured by a collector surface. This flow of electrons is a flow of electricity.

Plasma funds?

An ad hoc committee on plasma science and technology recommended to the National Research Council that it establish a Plasma Science Committee with responsibility for initiating and supporting major projects in the field of plasma science.

The committee envisioned an NRC expenditure of \$1.5 million in 1973-74 and hoped for corresponding support from other agencies for a total of \$3 million.

The recommended budget for 1971-72 was \$80,000 and \$750,000 for 1972-73.

"Plasma science today is where electrical and electronic science was 40 years ago, and where nuclear science was 25 years ago," says W. J. Cheesman, president of Westinghouse Canada and a member of the ad hoc committee.

Plasmas play an important role in potential generating systems using magnetohydrodynamics and nuclear fusion, as well as having increasing significance in the design of new equipment such as high-voltage switches and circuit-breakers.

Cabbages and kings

Ask a "dumb" question and someone will hurl a cabbage at you. Ask the best question and you'll walk away with a magnum of champagne.

The cabbages and champagne will be gimmicks to liven up a panel session at the Association of Municipal Electrical Utility summer conference for management at Ottawa's Chateau Laurier Hotel, June 7-9.

Other program features will include a discussion on economic development by senior representatives of the AMEU's commercial association, an engineering up-date by members of the association's engineering board and a session on communications by a senior faculty member from Ottawa University. Another key speaker will be Ontario Hydro's General Manager D. J. Gordon.

And for the ladies, it's hoped they will have coffee with Mrs. Roland Michener at Government House.

Safe place to work

One of the safest places to work must be Owen Sound, which, for the second straight year, has won the Electrical Utility Safety Association award for the lowest accident frequency in its category.

The award is for 57,999 accident-free man-hours. It was presented at the recent OMEA-AMEU convention. Exeter PUC, with 14,385 man-hours without an accident, Nepean Hydro, which had 129,298 accident-free man-hours and Ottawa Hydro with 814,837 accident-free man-hours were also presented with awards in their respective categories.

In a new departure a private contractor, K-Line Maintenance, Scarborough, was presented with an award for 74,443 man-hours without a compensable accident.

ilities back breeder

expected that the utility industry will make a significant financial contribution toward the development of the first breeder reactor in the U.S., says James R. Schlesinger, chairman of the Atomic Energy Commission.

The project, estimated to cost half a billion dollars, is a joint industry-government effort with a submission by Commonwealth Edison, of Chicago, and the Tennessee Valley Authority accepted on the basis for the demonstration liquid metal fast breeder.

In an unprecedented co-operative endeavor, conditional agreements amounting to \$40 million, to be paid over 10 years, have been made to date by all segments of the utility industry, including privately-owned, public and co-operatively-owned companies," Schlesinger said. □

Robert Speck dies

Robert Speck, of Mississauga, died April 5 after living 107 years with the heart of a 14-year-old boy. He was 56.

Mr. Speck had been ill for several years and received a heart transplant on December 20. He was released from hospital for a few days, apparently in good health, but returned six days later with severe stomach problems.

Mr. Speck was born in Toronto Township, now Mississauga. He entered politics as a councilor in 1956, was reeve for eight years and became Mississauga's first mayor in 1968.

He had served as president of the Ontario Association of Municipalities and the Ontario Association of Reeves and Mayors. He was a member of the Mississauga Hydro Commission from 1960 until his death, and was chairman in 1965.

Mr. Speck was a key figure in talks which led to the amalgamation of the north and south areas of Toronto Township in 1963 and the consequent takeover by the local utility of Ontario Hydro's rural distribution system. He also spearheaded efforts which culminated in a policy requiring underground services in residential areas of the community. □

Lignite survey

Drilling and survey teams will be working in the James Bay lowlands during the spring to determine the extent of lignite deposits so that planners can decide whether a power plant to burn the fuel is practical.

The decision to proceed with the lignite investigation was announced by the provincial government in the recent throne speech. Lignite resembles peat and is dug out of the earth in wet bogs. About 1,000 tons of it were tested last year at Hydro's Thunder Bay generating station, but the results were inconclusive. Part of the testing this year will involve transporting 100 tons to a plant in North Dakota for test-burning in special furnaces. □

Well-wishers

Mayor Don White's "coming out" party last month at Toronto's Sunnyside Beach was a success.

Friends, relatives, business associates and politicians turned up to wish Mr. White — manager of North York Hydro — well in his new position as president of the Association of Municipal Electrical Officials. The AMEO stages such a reception each year to introduce its new president.

Chairman of the meeting was A. L. Furanna, general manager of the London PUC and past president of the association. Among the guests were North York Hydro Chairman John Dunn and D. B. Macdonald, Ontario Hydro assistant general manager — regions and planning. □

An even match

Girls and boys were evenly matched in the Oral Communications Festival in Toronto last month.

The girls swept the elementary school section, the boys took all three prizes in the secondary school impromptu speech section while both sexes figured prominently in the secondary school prepared speeches.

Thirty-four speakers participated in the finals. The festival, formerly the Ontario Public Speaking Contest, is jointly sponsored by Ontario Hydro and the Ontario School Trustees Association.

D. Arthur Evans, MPP for Simcoe Centre and first vice-chairman of Ontario Hydro, is shown presenting awards to the three first prizewinners.

Janice Houston, 13, of Windsor Central School, placed first in the elementary section. The youngest speaker in the festival, nine-year-old Kelly O'Neill, of Oakville, was second and Sheryl Clay, 14, of Sudbury, placed third.

Steve Merritt, 17, a grade 12 student at Great Lakes Christian College, Beamsville, won the secondary school impromptu contest. Last year, he won the secondary school prepared competition. Geoffrey Snow, 15, of Brantford, was second and Mike Young, 16, of St. Michael's College School, Toronto, came third.

First prize in the secondary school prepared competition went to Tara Goltz, 17, of Espanola. Bonnie Blackwell, 16, of Paris, was second and Tony McQuail, 19, of Goderich, came third.

Winners in the elementary competition were awarded trophies as well as cash prizes of \$200, \$150 and \$100 while winners in the secondary events were presented with trophies and cash awards of \$300, \$225 and \$150. All finalists received engraved pens and pencil sets and scrolls of merit. □



Top talkers

Conserving energy

Substantial energy savings can be made by better insulating practices, including the use of heat-absorbing glass, says the New York Department of Public Service.

A report prepared for a total energy conservation workshop at Albany State University says that if all new buildings were insulated to electric heating standards, energy savings would be between 20 per cent and 70 per cent, depending on the type of heating used.

The report finds that electric heat provides a balance of generating plant use over a 12-month period and increases power utilization, with resulting cost benefits.

This balance, it says, also tends to level daily peaks during the heating season, whereas air-conditioning tends to aggravate the daily peaks.

As a result of increased use of generating facilities, it adds, "no increase in consumer rates would result from increased electric heating, despite the substantial capital expenditures involved. □

"It is more efficient," the report says, "to control air pollution from a central site than to allow a proliferation of sites. Centralized energy output results in a generally lower level of air emissions of all kinds, and thus tends to be less damaging than individual space-heating units."

From an environmental point of view, the report finds that, on balance, electric space conditioning would be advantageous in high-population density areas heavily loaded with pollutants from many sources. □

Horse sense

A 40-foot diameter swimming pool, electrically-heated, has been built on a farm near Wheatley. What makes the pool unusual is that it's strictly for horses.

Veterinarian Dr. L. S. McKibbin had the pool built to assist him in the treatment of injured race horses in a manner similar to whirlpool therapy. The water is heated to 70 degrees and horses with leg injuries can maintain daily exercise in the soothing warmth.

The pool was designed by Gord Duncan, farm sales supervisor of Ontario Hydro's Western Region, with the help of Ron Wright — Essex Area sales representative. □



Soothing those aches

An energy 'crunch'

Every Canadian now spends less than \$1 a day for energy, yet this is equivalent to having 200 slaves working for him, says Z. P. Pokrupa, a consultant economist with Shell Canada Ltd.

Speaking at the annual safety conference of the Industrial Accident Prevention Association, Mr. Pokrupa said Canada's standard of living is closely linked to our consumption of energy, which is doubling every 10 years.

Mr. Pokrupa said that more than 90 per cent of the energy directly harnessed by man comes from fossil fuels — oil, gas and coal. However, he warned that reserves of fossil fuels are finite. "The period of cheap energy is over, and we must face the fact that the cost of producing energy is definitely on the increase throughout the world.

"I foresee an energy crunch to come sometime during the next 10 years when we all may have to reassess some energy uses."

Suggesting there would be a decline in most energy sources, Mr. Pokrupa said there is no cause for alarm. "This decline will be more than taken up by nuclear energy, which will be a major energy source in the future. Nuclear energy will eventually provide almost unlimited power once the fusion reactor is perfected." □

Noise probe

A \$45,000 study of noise levels and their effects on the cities of London and Woodstock has been commissioned by the Ministry of the Environment.

Environment Minister James Auld announced in the Legislature that a team of University of Western Ontario researchers will measure noise levels in the cities' commercial, industrial and residential areas in co-operation with Ministry personnel and employees of the two municipalities.

Their investigation over the next 14 months will assess not only existing noise levels but also their effects on people.

Mr. Auld told the House that this study and similar studies under way in Toronto and Hamilton will provide valuable information for the development of effective anti-noise regulations for the province.

He predicted that Ontario's noise control system will probably involve two levels of government, with municipalities dealing with simple problems and the province dealing with complex problems such as multi-source industrial operations.

"In addition to these studies," Mr. Auld said, "the Ministry's air quality branch is looking at regulation in other areas and is studying specific noise problems in Ontario to ensure that any regulations will be effective."

municipal briefs

Cats are annoying, at least in the opinion of Galt PUC's residents. The utility has decided to charge cat-owners a minimum of \$10 per hour at overtime rates to rescue Felix from atop a hydro pole. Translated into cold cash, this could mean from \$20 up or more on the next electric bill. The reasons: too many calls, bites and scratches. **North York Hydro** employees now get the inside information on their utility through a monthly newsletter. The six-page publication contains information on utility matters plus details of sports events, recreation club activities and even classifieds. It is distributed to pensioners.

North York Hydro employees and their families went on guided tours of the Pickering nuclear station this month.

Bruce Wallace, secretary-treasurer of East York Hydro, has retired after 43 years' service to the utility. During this period he missed a day because of sickness. His wife, Helen, retired at the same time. She worked for the commission for 40 years and was Mr. Wallace's secretary when they were married in 1966. A retirement dinner was held for the couple.

M. W. "Mel" Downs, who started work as a lineman 42 years ago, has retired as manager of Orono Hydro. He held the position since 1967, and before that managed Streetsville PUC for a year. From 1936 to 1966, he was employed by Meaford PUC and latter 19 years as manager.

Thunder Bay Hydro has petitioned city council to have its commissioners elected at the next municipal election rather than appointed. The present commission was appointed — two members by the city and two by Ontario Hydro — after the amalgamation of Fort William and Port Arthur.

Early March meant several sleepless nights for Oakville manager Ross Lamb and most of the utility's staff. A severe storm hit the municipality and downed more than 600 lines. **Sparky**, Meaford PUC's cartoon character who from time to time has a column in the local weekly newspaper on electrical subjects, has a new relative and she's doing essentially the same thing. **Auntie Pollution**, from Upper Smogsville, is now writing periodic columns in the paper, pointing up the benefits of electrical power.



Don wright sees it

They are a persistent lot, these Americans, and while they have long since ceased bombarding the Japanese with naval guns and super bombers they still seem determined to do them in. And they're getting real sneaky. This time they are using hamburgers and French fries – infinitely more dangerous in the long run.

So far the new campaign has been a total success. Fast-food stands are sprouting like mushrooms on the Ginza and front line despatches indicate that Kentucky fried chicken and jumbo hamburgers are taking Tokyo by storm.

In a country which enjoys a very low incidence of heart disease, it would be a pity to see the citizenry laid low by the high-cholesterol, high-calorie, low-nutrition eating habits of the Americans. It's sitting below the belt, so to speak, and we hope that the Japanese will soon get the wind up.

Canadians, of course, have been under the same kind of blitzkrieg for generations and we've pretty well joined our hotdog cousins to the south in going to pot. If it's true that an army marches on its stomach, we should be able to muster some of the best equipped troops in the world as far as transportation is concerned. Next time we revise the flag we should try to work in a French fry or two – couchant, perpendicular, in a pool of vinegar.

Always resourceful, the U.S. appears to be lining up a secondary or supportive position should the great fried potato offensive falter. Pigweed and dandelions are our weapons being readied.

These and other "sturdy foreign weeds" are beginning to sprout on the immaculate grounds of the Imperial Palace in the centre of Tokyo, "some of them blown over from the United States," says one report.

And that's got to be classified as the ultimate weapon. Ordinary wars can be won or lost and forgotten but the fight against the dandelion is eternal. Once started, involvement is forever.

■ Harking back to the diet (not the Japanese parliament) we can't blame breakfast cereals for loading us with suet. According to recent U.S. accounts, the main kind of sustenance we are likely to derive from our breakfast bowls is pop music of the snap and crackle variety. Empty calories is the phrase they use.

It is reassuring to learn that a Senate sub-committee is looking into the advertising claims of some of the crunchie-wunchie crowd but it's a bit late for us. We've been stuffing ourselves with one particularly tasteless brand since slightly before the Boer War on the premise that we were building muscle, bone and curly hair. At least now we know what went wrong.

■ Neither can we lean too heavily on the staff of life if we are to believe what they say about our daily bread. Even the rats can't survive on a steady diet of the kind of stuff that's popping out of our ovens today.

A nutrition expert at the University of Texas says he fed 64 laboratory rats on nothing but "enriched" bread from commercial bakeries. Within 90 days, he claimed, 40 of the poor devils had died of malnutrition. The survivors were severely stunted.

So much for flour power.

■ Conservationists concerned with the state of our waterways may soon have a new theme song if the theory of one well-known marine expert is correct. Suggesting that we may be fouling up our priorities as well as our rivers in our preoccupation with nitrates and phosphates, he points out that most of the valuable fish life in the oceans is found in areas rich in these nutrients.

Lack of oxygen is the chief culprit, as he sees it, and he urges that active programs be undertaken to increase the oxygen content of our lakes and rivers by both natural and mechanical means. This isn't going to be an easy job, he allows, and maybe it's one way we can all do our thing for ecology.

Why not organize gala beach blow-ins to the accompaniment of massed bands playing I'm Forever Blowing Bubbles? This would be good for the lungs as well as the fish and much easier on the bunions than the more traditional walkathon. Bubbles for Billions blows the mind.

Obviously, though, the man is on the right track and things are so desperate in Missouri that the U.S. Corps of Engineers has been blowing bubbles into one lake just to keep the fish alive long enough to be caught. They've been using 10 large construction-type air compressors "designed to run quietly so that campers and

fishermen would not be disturbed."

We've been doing the same thing in fish bowls for years, of course, but the thought of casting a line under these conditions does not appeal to us. Wonder what they do with the fish and all the little colored pebbles when they clean the lake?

■ Another little piscatorial gem comes to us from a fishing tackle company which has hooked on to a novel gimmick for celebrating its 25th anniversary. Upon returning a card enclosed with each piece of equipment, the customer is assured that the company will stock a pair of gamefish in a lake or stream "in your name or in the name of someone you specify."

Guess it would be nice to know that somewhere down in the murky depths lurks a lunker bearing one's name – even if it does end up on somebody else's table. Look ma – they're frying Uncle Charlie.

■ Still another item with a fishy odor concerns a report by a U.S. utility about "unreasonably restrictive regulations" governing warm water discharges from thermal generating plants into Lake Michigan. According to the utility, the principal benefit of installing cooling towers would be the protection of from 3 to 23 pounds of coarse fish per day. The cost of protecting these poor fish would be on the order of \$2,530 per pound.

How's that for making the most of the pollution dollar!

■ Speaking of the pollution dollar, the dollar itself is so polluted that we are risking everything from cysts to intestinal parasites every time we crack open our wallets.

So serious was the problem in the Philippines that the government stopped production of paper money except for large bills. These were found to be relatively germ free due, no doubt, to lesser handling.

In Kentucky, two doctors at the Louisville School of Medicine found disease-bearing germs on 50 paper bills of various denominations borrowed at random from the staff. Metal coins were also found to be infected.

Helpful advice offered by the doctors to overcome the problem includes: keep your money in the bank; if you must carry money, confine it to \$50 bills or larger; get rid of your money rapidly. It's all a bit frightening but we probably owe our own comparatively good health to lack of exposure. Just the same, we'd be prepared to take a chance if anyone wanted to unload some of his filthy lucre in our direction. □

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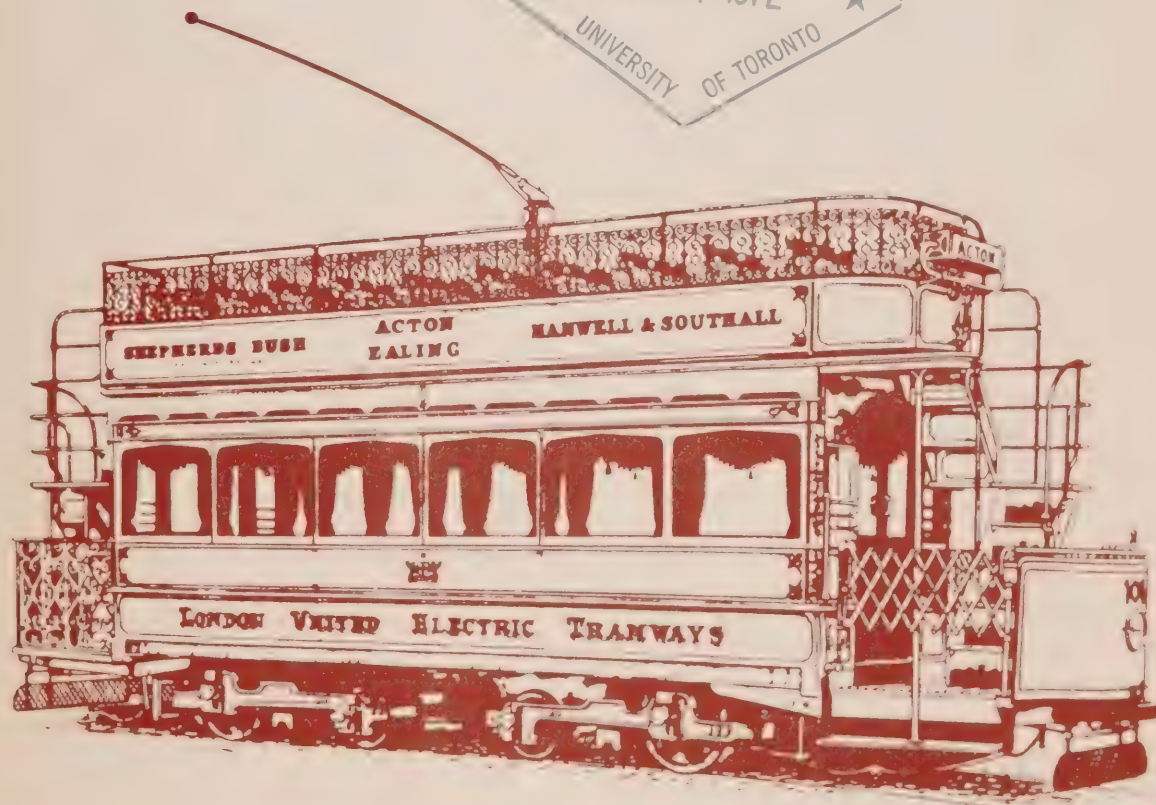
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RETURN OF THE TROLLEY





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the cover

As our illustration of a 1901 double-deck London streetcar shows, electric trolley vehicles have been around a long time. Their popularity waned as the automobile became supreme. But right now they're making a comeback as an economical and pollution-free form of transportation. See story opposite. Cover illustration reprinted by kind permission of Hawker Siddeley Canada Ltd.

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Viewpoint

Making the most of our energy

Citizens of the United States will find few grains of comfort in the six-year national power survey released recently by the U.S. Federal Power Commission which sets out long-range guides for the development of the nation's power industry through the year 1990.

Electrical needs will quadruple by 1990, the report predicts, and a cutback in non-essential uses may be needed to help ease shortages.

Congressional hearings and public statements freely allude to America's energy crisis and all warn that the problems created by the overwhelming hunger for energy must be faced and resolved. Shortages are foreseen not only in electricity, but for virtually all other common sources of power for homes, farms and industry.

The situation in Canada is not parallel and the need for remedial action is less acute at this point in time. Some of the provinces still have substantial hydro-electric power sources which are capable of economical development and the country's present electrical supply is much less reliant on fossil-fuels. Canada also appears to be in a better position to meet its future requirements for gas, oil and uranium from domestic sources.

But some aspects of the U.S. power crunch are not absent from the Canadian scene. Gas and oil industry spokesmen here no longer speak in terms of unlimited reserves. Environmental considerations are already influencing public attitudes and the pattern of fuel consumption. Coal costs are rising as they are for most fuels. Conventional steam and nuclear plants will predominate in our future electrical development.

We may be comparably well off but we are in no position to squander our resources. They must be used to the best possible advantage.

The Government of Ontario has taken a big step in the right direction in establishing the Advisory Committee on Energy.

In his statement to the legislature on the establishment of this committee, Premier Davis said:

"To underline our determination to ensure that we maintain an adequacy of supply of energy, choice between the various types of energy, and means to match them with those uses to which they are best suited, we set in motion machinery which will ultimately result in a sound long-range policy for the needs of, and use by, the people of Ontario."

Obviously, Ontario alone cannot establish the best use of the country's energy supplies. Except for nuclear and hydro-electric power, this province is almost totally dependent upon sources outside its boundaries. It can, however, set out its own energy requirements in clear terms so as to assist with the broader approach which can ultimately lead to the optimum use of energy resources.

As Mr. Davis said in the legislature:

"We are accepting our responsibility to create a regional policy which will reflect and demonstrate the needs of this province which we feel differ somewhat from some other areas of Canada and which can be of great assistance to the Government of Canada in framing a national policy."

Such a policy would appear to be a priority item if we are to avoid in this country the kind of energy situation which is causing so much alarm south of the border. □

CINDERELLA

trolley becomes a

PRINCESS



thanks to Prince Charming TTC

She was a 20-year veteran of the game. She'd been walked on, stepped on, kicked, shoved and battered about. She had been left out in all kinds of weather and her skin was cracked and rough. Salt had been rubbed into her wounds and they had festered. Her insides were beginning to ache, but her heart continued to beat strongly. She knew that with a little help she could recover and continue to lead a useful life.

For Cindy, it was a touch-and-go situation. After all, she had run almost 700,000 miles – more than the share for any self-respecting trolley coach. And she had been badly fractured of late, the victim of an assault by a lamp standard. Rumor had it that she was to be sent to the junkyard.

Cindy was the nickname given to trolley coach 9020 in the Toronto Transit Commission fleet. Her story has a happy ending, though. Through a dramatic series of events, this lumbering Cinderella was transformed into the princess of the fleet. But it took more than a magic wand to do it.

It was in mid-1967 that a group of engineers walked behind the TTC's Hillcrest shops and examined Cindy where she stood awaiting the wrecker's blowtorch. The TTC had decided on an experiment in which two trolley buses would be rebuilt as a way of maintaining the fleet of electric vehicles.

Cindy was sent to Western Flyer in Winnipeg. The other bus was shipped to England, but the company which was to rebuild it ran into financial difficulties and the vehicle somehow disappeared.

Why rebuild broken-down trolleys? Well, running on electricity, they don't cause pollution and they run longer and further than conventional buses. In addition, the TTC has a big investment in overhead lines. Unfortunately, no North American manufacturer indicated a willingness to resume production of trolley vehicles. The cost of imported vehicles was considered far too high.

An economic study by the TTC showed that diesel buses have a useful life of 18 years and 633,600 miles. Trolleys, on the other hand, will run 25 years and travel 880,000 miles.

Even more significant is the operating cost. Trolleys are 30 per cent cheaper to run than diesels. (Figures place diesel operation at 22.41 cents a mile compared to 16.02 cents for trolley coaches.)



into Transit Commission's "Cinderella" trolley (below) is seen before and after a major facelift. At left, a streetcar is stripped down prior to refurbishing and trolley buses are rebuilt in TTC's Hillcrest workshops.



With this information, engineers determined that it would cost the commission an extra \$338,000 annually to operate if the 151 trolley coaches were scrapped and replaced by diesels. This was based on an average of 35,200 miles a bus per year.

In addition, trolley buses do not require as much heated storage as diesels. Had the trolley fleet been scrapped, the TTC would have been faced with a substantial capital outlay for garages.

In September, 1968, Cindy was returned to Toronto with a complete facelift. She was placed in service for a year of exhaustive tests and, as a result, the TTC signed a contract with Western Flyer for 151 more body shells. These were to be shipped to the Hillcrest shops where TTC mechanics would do the rest.

Total cost of the rebuilt buses is \$5,239,700, of which just over \$4 million was for the new bodies. Not only were the rebuilt trolleys cheaper than imported vehicles (less than half the price quoted) but they were about \$5,000 per bus below the cost of comparable diesel units.

Plans were made to establish a full-scale assembly line at the Hillcrest shops. The first vehicle rolled off in March, 1970. The remaining vehicles should be completed next month. A total of 135 are now in service.

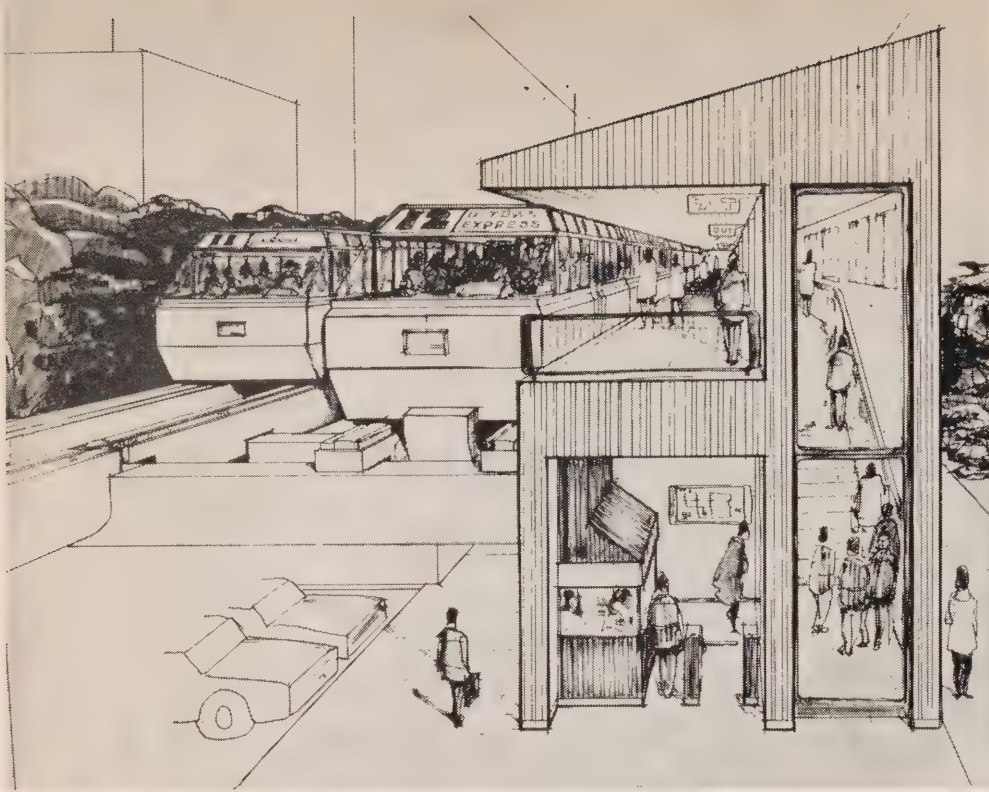
As old buses start off on the assembly line, mechanics remove compressors, motors, braking systems, control gear, retrievers, resistors and housings, trolley base shrouds, trolley poles, springs and bases for later use. This material is overhauled for about \$2,000. If it were purchased new the cost would be around \$20,000. Even accelerator pedals and brake pedals are saved.

While not used on the new buses, lights are retained for the TTC's streetcar fleet. Finally, the old shells go for scrap, although some occasionally end up as restaurants, boutiques or even summer cottages.

Early in the rebuilding program, TTC engineers decided that additional spare parts would be needed. So when the cities of Halifax and Cornwall abandoned their trolley fleets, TTC buyers were there. Since the vehicles had been written off by their owners, 23 of them were purchased for a nominal price.

Because of environmental pressures, the Toronto program has sparked renewed interest in trolley buses across the continent. Ironically, the Toronto fleet has been expanded in recent years through purchases from other Canadian and U.S. cities which decided to scrap their trolleys and convert to diesel.

One of the rebuilt buses is at present touring American cities on behalf of Western



Toronto firm has proposed a system of elevated transit (left) to help fight traffic congestion. Transportation proposals include kinetic energy vehicles (right), which use the energy stored in a flywheel to drive them between electrical charging stations. Below, artist's conception of new look in streetcars proposed to the TTC.

Flyer. Another was built in the TTC shops for Dayton, Ohio. At least two Canadian cities — Edmonton and Vancouver — are considering renewing their trolley coach fleets while others have delayed plans to abandon them. Hamilton is now in the midst of a refurbishing program.

Western Flyer has entered into an agreement with American Motors General in the U.S. which will likely result in a new wave of trolley coach production in that country. Such centres as San Francisco, Boston, Chicago, Cleveland, Los Angeles and Portland have been mentioned as interested in the program. San Francisco is considering the purchase of 200 such vehicles.

In Toronto, the pioneering TTC has now set its sights on streetcars. Long since museum pieces in other parts of the country, they are being retained in Toronto because of their low operating cost, high passenger capacity and non-polluting operation.

A total of \$300,000 has been set aside this year to refurbish 50 streetcars. However, the job is not a major rebuilding task like the buses and external appearances won't be changed.

Len Bardsley, the TTC's manager of equipment, hopes that eventually a new look in street cars will be available. He has already approached one company for ideas — Hawker Siddeley Canada Limited, which manufactures subway cars.

The trolley bus rebuilding program was Mr. Bardsley's brainchild. He recalls there

was some difficulty selling the idea initially both within the TTC and outside. But a desire to maintain pollution-free vehicles won out.

Mr. Bardsley serves on two committees of the U.S. Department of Transport's Urban Mass Transportation Administration, which is exploring ways of improving urban transit on the continent.

"There's a growing feeling toward retention of electric vehicles and more and more transportation organizations are getting involved," he says.

Various types of vehicles are being researched and developed through grants from UMTA. These include computer-directed machines which require no drivers and are guided by a single rail along a roadway, hoverbuses which operate on a cushion of air, and transportation systems on elevated tracks.

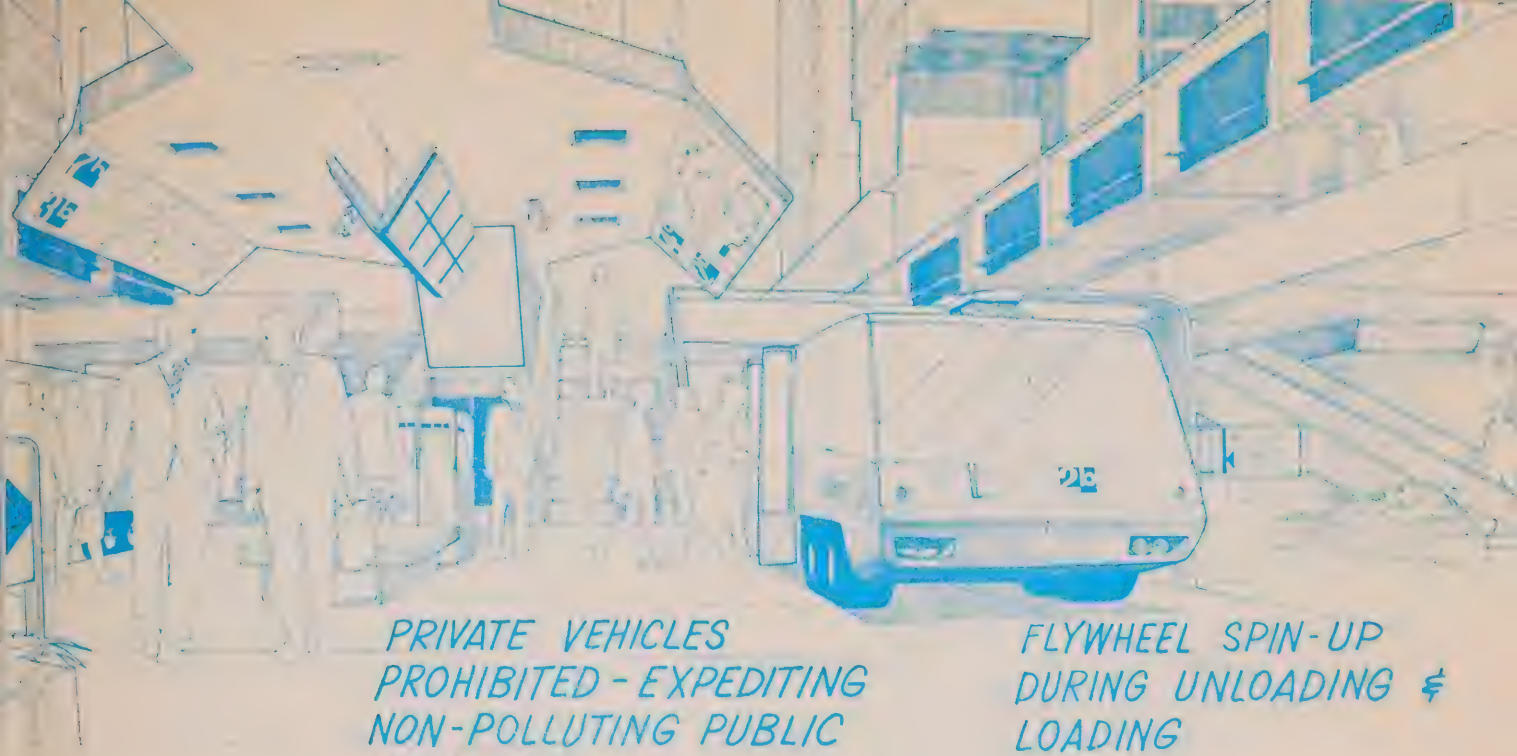
Mr. Bardsley is particularly interested in a proposal that was advanced recently by the Lockheed Corporation. The company has applied to UMTA for assistance in the development of a kinetic energy bus that would operate with a high-energy flywheel. The principle would be similar to a child's friction toy. The bus would utilize electricity at recharging stations along its route to energize the flywheel. Mr. Bardsley says one such bus is in use in Switzerland, but the Lockheed proposal would be more advanced and make use of new metals and technology. A conversion package might

also be available for trolley coaches and would thus eliminate the need for overhead lines.

The Ontario government is also investigating new modes of public transit. Several futuristic proposals have been submitted to the Ministry of Transportation and Communications with the intent of creating a prototype system to operate initially between downtown Toronto and Old Place.

Already one Toronto company, A. D. Margison and Associates, has unveiled a proposal involving elevated track that could conceivably be built along Hwy 401 rights-of-way. According to the company, such a system could be built for about \$4 million a mile compared to the projected \$20 million a mile for the Yonge Street subway extension. As well as carrying passengers, this type of system could be used for freight and garbage collection, the company says.

Lorne Main, spokesman for Hawker Siddeley, says his company is also working on futuristic designs for mass transit. Emphasis is given to electrical systems. Hawker Siddeley is the builder of Toronto subway cars and the GO Transit coaches. Mr. Main says there's a need in Canada for more research and development on transit systems. He suggests that Canadian government grants will have to be provided, similar to the UMTA grants if companies are to compete in developmental work. □



PRIVATE VEHICLES
PROHIBITED - EXPEDITING
NON-POLLUTING PUBLIC
VEHICLES

FLYWHEEL SPIN-UP
DURING UNLOADING &
LOADING



HEARN STEPS ON THE GAS

Construction of a 700-foot stack and the use of natural gas at the Hearn station have improved the air Torontonians breathe.

by Bob Mo

A dramatic reduction in the emission of sulphur dioxide occurred at the R. L. Hearn generating station on the Toronto waterfront last winter. But although much has been achieved, Ontario Hydro's fight against air pollution continues in other directions.

By converting the Hearn station to burn natural gas as well as coal, sulphur dioxide and particulate emissions will this year be reduced to one-sixth of the previous levels. It's expected that Hearn will burn coal only to meet peak demands in the coldest winter months, cutting annual coal consumption from 1,800,000 to approximately 300,000 tons.

When the station is burning gas exclusively, hardly a trace of sulphur dioxide will be emitted. In addition, a new 700-foot stack ensures that exhaust gases will be kept far above ground level until they dissipate in the atmosphere.

The 700-foot stack replaces eight smaller chimneys which are being demolished. Together with the cutback in coal consumption, it has greatly reduced air pollution, particularly at ground level.

The most recent air quality control measures emphasize that Hydro's first thermal-electric plant continues to be a pace-setter for advances in environmental technology. Since 1951, when the first Hearn unit was placed in service, the station has become a proving ground for new equipment and techniques.

These have included the upgrading of the original dust collection equipment (the largest units at the 1,200,000-kilowatt plant are equipped with electrostatic precipitators designed to remove 99.5 per cent of the fly ash from flue gases), an early warning system to permit cutbacks in production, or the use of gas during unfavorable weather conditions, and an air-monitoring system in the plant's vicinity.

Hearn, too, was the location of early tests involving injection of powdered limestone into a boiler to absorb sulphur. Limestone injection has now been dropped in view of more promising development work on a scrubber device which uses a slurry of limestone and water to remove sulphur dioxide from flue gases.

This pioneering work explains, in part, why approximately \$19 million has been spent over the years at Hearn for air quality controls. The sum includes \$9 million for the high-rise stack. In addition, use of natural gas as well as coal boosts operating costs by \$5 million a year.

Consumers' Gas has contracted to supply Hearn with 49 billion cubic feet of gas annually on a firm contract. Additional supplies are available on an interruptible basis. On the average, the station will use about as much gas as is now consumed by the rest of Metropolitan Toronto.

In addition to reducing sulphur dioxide emissions, the switch to natural gas at Hearn has reduced another class of pollutants, nitrogen oxides.

Nitrogen oxides, which are among the components of photochemical smog formed during combustion of fossil fuels in furnaces, boilers and automobile engines. The federal government attributes nearly 50 per cent of nitrogen oxides in the atmosphere to motor vehicles and has proposed regulations calling for a sharp cutback in emissions from new cars by 1990.



nitrogen oxides constitute less than one per cent of the Hearn flue gases when either oil or natural gas is being burned and Hydro's emissions now meet provincial air quality criteria. By special operating procedures, Hearn staff hope to reduce the production of nitrogen oxides even farther.

In the meanwhile, Hydro researchers are investigating the possibility of removing sulphur from the flue gases in a pilot limestone "scrubber" that is to be installed at Lakeview generating station, west of Toronto. The Lakeview scrubber is a scaled-up version of the initial scrubber tested at Hearn.

The pilot plant has operated for more than a year at Lakeview, including a 1,000-hour continuous run. Results indicate an efficiency between 70 and 80 per cent in removing sulphur dioxide.

Operation of the plant will be continued next year to provide design data for a larger demonstration plant under consideration. Engineers will also test and assess improvements.

Hydro's clean air team is also studying the use of sorbents other than limestone, an inexpensive substance which would likely have to be discarded as a non-saleable gypsum sludge composed of calcium sulphate and calcium sulphite after reacting with sulphur dioxide.

Preliminary work indicates the possibility of minimizing the waste disposal problem by using other, costlier, alkaline sorbents which would be regenerated and recycled. The most desirable end-product would be elemental sulphur, which could be recycled by other industries.

Future markets for sulphur are doubtful because a world surplus exists but, taking a long-range view of resources, it might prove worthwhile to store the sulphur for future use. It's estimated that a Hearn-size plant burning 2.5 per cent sulphur coal and equipped with a 90 per cent efficient sulphur-recovery system would produce 27,000 tons of elemental sulphur a year.

Alternative control systems could yield sulphuric acid, liquefied sulphur dioxide, or ammonium sulphate. Major users of

sulphuric acid, a nickel industry by-product which is in over-supply in Ontario, include the fertilizer and chemical industries. Gypsum sludge, incidentally, is a by-product of fertilizer plants, which use the sulphuric acid to "digest" phosphate rocks. Ammonium sulphate has limited use as a fertilizer.

When all factors are considered, an elemental sulphur recovery system appears to be the best way to limit the disposal problem, particularly if installed in several generating stations. Lakeview, for example, would yield 54,000 tons a year, twice as much as Hearn. Other systems for a Hearn-size plant would produce 300,000 tons of wet gypsum sludge, 133,000 tons of ammonium sulphate, 103,200 tons of sulphuric acid or 54,000 tons of liquefied sulphur dioxide gas.

In any case, technical feasibility and cost-benefit studies will obviously be necessary before any decisions can be reached, but indications are that all sulphur recovery systems will be costly.

No firm figures are available for a large-scale installation but capital costs of a wet

Construction of natural gas pipeline to serve R. L. Hearn Generating Station is shown in final stages. A 700-foot stack replaces eight smaller chimneys.

limestone scrubbing system, earlier estimated at \$12 to \$24 million for a Hearn-size station, are now considered low. Operating costs would add considerably to the total outlay. Regenerative systems would be even costlier and returns from possible sales of sulphur by-products are uncertain.

Meanwhile, Hydro is considering conversion of other thermal-electric plants to alternative fuels with low-sulphur content. Fuels under investigation are coal, oil, natural gas and liquefied natural gas.

Hydro's progress on sulphur recovery systems illustrates a point made in a recent editorial in *Environmental Science and Technology* by Abel Wolfman, professor emeritus of sanitary engineering at Johns Hopkins University.

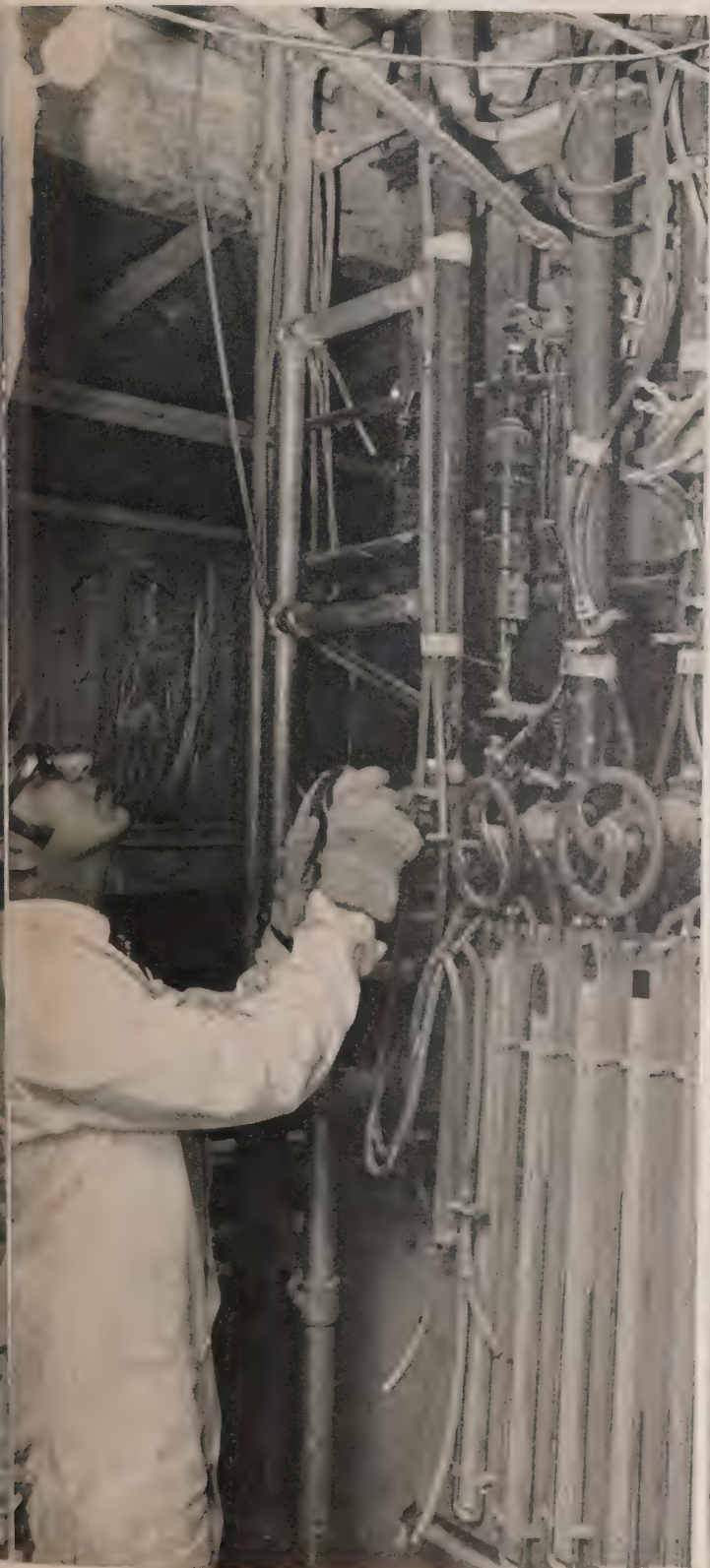
"The real difficulty in quick and easy solutions to problems generated in the environment rests forever in the fact that the issues are rarely, if ever, black or white," he said.

"Their diagnosis and ultimate solution to the degradation they may or may not create lie in a joint assessment of tangible and intangible benefits and costs. Such assessments are complex, time-consuming, irritating, and inevitably unsatisfactory to some."

But, despite the frustrations and uncertainties, the search for solutions continues as Hydro seeks to fulfill its pledge to install better equipment for air quality control as soon as it's developed for practical application in large thermal plants. □



technician, left, makes adjustment in pumping
sulfur dioxide "scrubber" at Lakeview station.
Helium-filled kytoon (kite-balloon) is used to
collect data on atmospheric conditions at altitudes
up to 1,600 feet at proposed sites of new fossil-
fuelled stations.





VIBES ARE GOOD FOR
THE WIRED-UP STAR



ation's most progressive newspaper has electronic arsenal at its command

by Sheila Kenyon

er since Joseph E. Atkinson took over
fledgling 7,000-circulation Toronto
r in the 1890's, the paper has been
lowing its way sturdily, irresistibly, into
Canadian life and time.

Originally a rather falsetto voice supporting
Wilfrid Laurier's Liberals, the Star's
es have swelled and deepened down
years to the thunder of its presses.
ay, with the demise of the Toronto
gram and the troubles of La Presse, the
t with a daily circulation well over half
million is by far the largest, most progres-
sive and most fascinating newspaper in
Canada.

Why people think of their newspaper as
wildly mysterious phenomenon that
shops on the front porch daily, courtesy
of a bright-eyed kid on a bike. In a world of
television and radio, stereo, videotape and
teletext, Marshall McLuhan's philosophy, a news-
paper even seems an anachronism.

So the Star. It is not merely a thing of
paper and print, typewriter-pecking
reporters and eye-shaded editors. In its
ultra-modern home at 1 Yonge Street,

the Star is more of a marvel in electronics
and electricity than it is of paper and print.
It is a masterpiece of communications
expertise.

The building itself, of precast concrete,
is on the edge of the to-be-built Metro
Centre, not far from O'Keefe Centre. The
Star occupies five storeys of the L-shaped
edifice. The tower reaches a height of 25
storeys and radio station CKEY is in the
penthouse.

On the roof will be a tall radio antenna,
which will also serve the Star. For although
the Star produces a newspaper, it uses
every means, including two-way radio,
for gathering its news.

In the old days, a reporter went out with
notebook and pencil, came back and typed
up his story. The story went to the editors,
who corrected it and marked it for setting.
Then it passed to the composing room,
where rows of men sat working clattering
linotype machines.

Each machine spewed out lines of type
on lead slugs. Pictures were made into
engraved blocks and they, with the type for

the story, were locked into a page form.
This was wheeled — for with all that lead it
was heavy — to be "matted." The matte
was a flexible paper mould made from the
type and photoengravings.

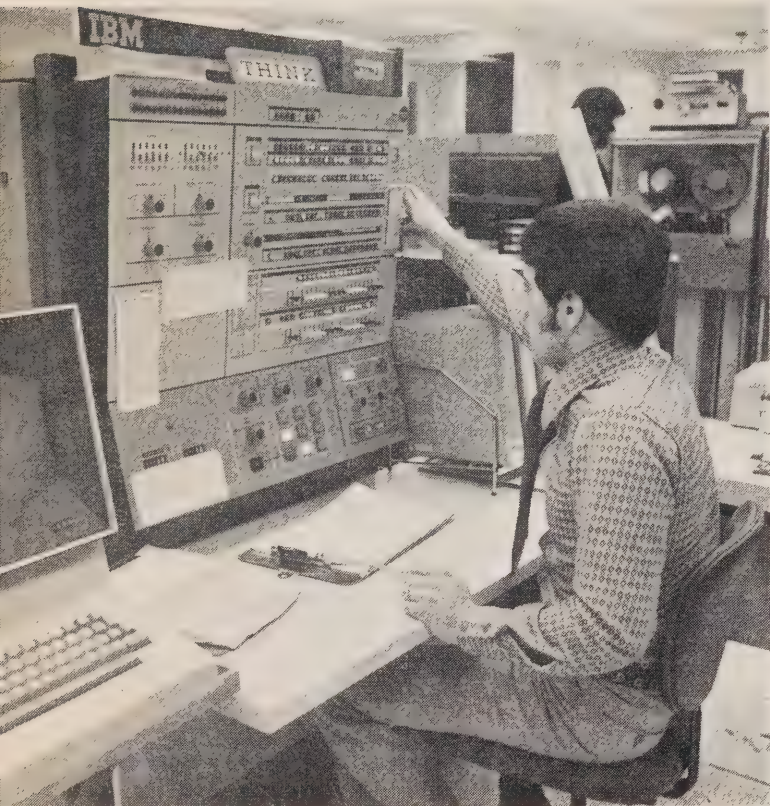
Then the matte went for stereotyping.
That is, it was curved into a half cylinder
and exposed to molten metal. When the
metal cooled, its surface retained a perfect
image of the page for the newspaper. This
stereotype plate was then locked on to
the rotary presses.

Today, the system is basically similar, but
there are many important differences.

The reporter clings to his pencil and copy
paper, as well as to his aged typewriter.
But if he is out on an important story and
sending in a lot of copy, he may carry a
small Xerox machine with him.

With this 18 lb. gizmo, he can hook into
a telephone line anywhere and his typed
story will be reproduced in the Star's office.
The Star maintains permanent photocopy
installations in its various bureaus — City
Hall, police headquarters, Ottawa, Montreal
and Quebec city.

A pre-programmed computer (below) selects the correct type, arranges the spacing, and produces a punched paper tape to set the Star's classified advertisement columns. Centre, a pressman fits a stereotype plate on one of the presses. At right, the latest edition rolls off.



If the reporter doesn't have a portable facsimile machine, he can telephone his story to an automatic dictating machine in the Star office. Later, a girl will transcribe the story on to punched tape.

If he's working in the office, the reporter may want to refer to files. In the old days, the librarian had to rummage around the shelves for dusty pasteup books. Today, she presses a button and the correct file is automatically presented. The file consists of a container in which are both papers and microfilm. A similar system is used by Metropolitan Toronto Police.

The Star is also part-owner of the co-operative wire service, Canadian Press, which supplies a news service to dailies across the country. In its turn, Canadian Press has exchange arrangements with foreign wire services such as Associated Press in the U.S. and Reuters in the U.K.

Originally, wire services like these were transmitted by Morse telegraph, a slow and laborious business. Then, a Canadian from Mill Village, Nova Scotia, Frederick George Creed, invented the automatic

printer, which had a keyboard like a typewriter. This was the precursor of the modern teletype machine which flashes news around the world. Creed's printer was first used in London, England, in 1912, and was introduced by Canadian Press across Canada in 1928.

The Star receives many of its pictures by wirephoto, sometimes by Canadian Press, Associated Press or United Press International and sometimes over its own portable machines. The principle of the wirephoto was also discovered by a Canadian, Sir William Stephenson, a Winnipeg millionaire, who was later chief of British intelligence in New York during the Second World War. Stephenson transmitted his pictures by radio, the technique being first used by the London Daily Mail in 1924. Later, the idea was adapted to send pictures by telephone line.

Once the reporter has written his story, it goes to an editor then to the composing room. At present, the editor still uses a pencil, but the Star has its eye on new editing equipment. If this is introduced, reporters will have to learn touch-typing.

Their copy will come out as tape which be fed into an editing machine.

The editor will see the story on a TV-screen and will edit by means of a special pencil on the cathode ray tube. The machine will automatically make the correction and show him perfect copy on the screen. Then, at a touch of a button, it will produce punched tape for feeding into automatic type-setting machines.

A paper the size of the Star requires a large press room. It is, in fact, a mighty cavern 350 feet long, 95 feet wide and 42 feet high. It contains five new presses, each capable of producing more than 1,000 papers a minute. There's another order. In addition, the Star is running presses in the defunct Telegram building.

The Star's presses are each operated by ten 70-horsepower motors which generate considerable heat. It was the availability of this heat from the press room, the composing room and the printing department and composing room that led to the choice of a heat-pump heating and cooling system for the entire building. The heat is taken from the mechanical department.



interior offices, which need to be kept cooled anyway, and distributed around the building. It has been calculated that the system can supply all the heat needed when the temperature outside drops below 50°F. Then electric boilers compensate for the difference.

Power is supplied from two separate transformer vaults, one for lighting and mechanical equipment and one for other electrical requirements. Emergency power will be available from two generators, one for the exclusive use of radio station CKEY and the other for essential building services in the operation of vital equipment.

The Star is examining a system which would ensure that the presses run at maximum capacity at all times. The idea is to link them to a service computer which will continuously assess performance and maintenance and pinpoint trouble in the event of a breakdown.

Each roll of paper for these huge presses comes in a roll 65 inches long, 42 inches in diameter and weighing a ton. The presses, operating at maximum capacity, will require 600 such rolls

a day. Handling has been completely automated.

Now, when a roll is dumped off a truck it is automatically taken to the roll preparation platform and thence the presses. If not needed, it is automatically removed to storage. The roll-handling equipment is designed for later conversion to fully computerized operation.

In the mailing room, a process computer regulates bundle counting and the distribution of bundles to trucks for delivery. It is one of the most modern in the world and is designed to process the newspapers at the same speed as the presses operate.

The advertising department gains at least as much from electricity and electronics as any other department. Ad copy is fed into a pre-programmed computer which selects the correct type, arranges the spacing, and produces a punched paper tape. The tape is used to drive typesetting equipment.

The classified advertising department is being linked to the Star's large IBM 360/40 computer. This computer is at present

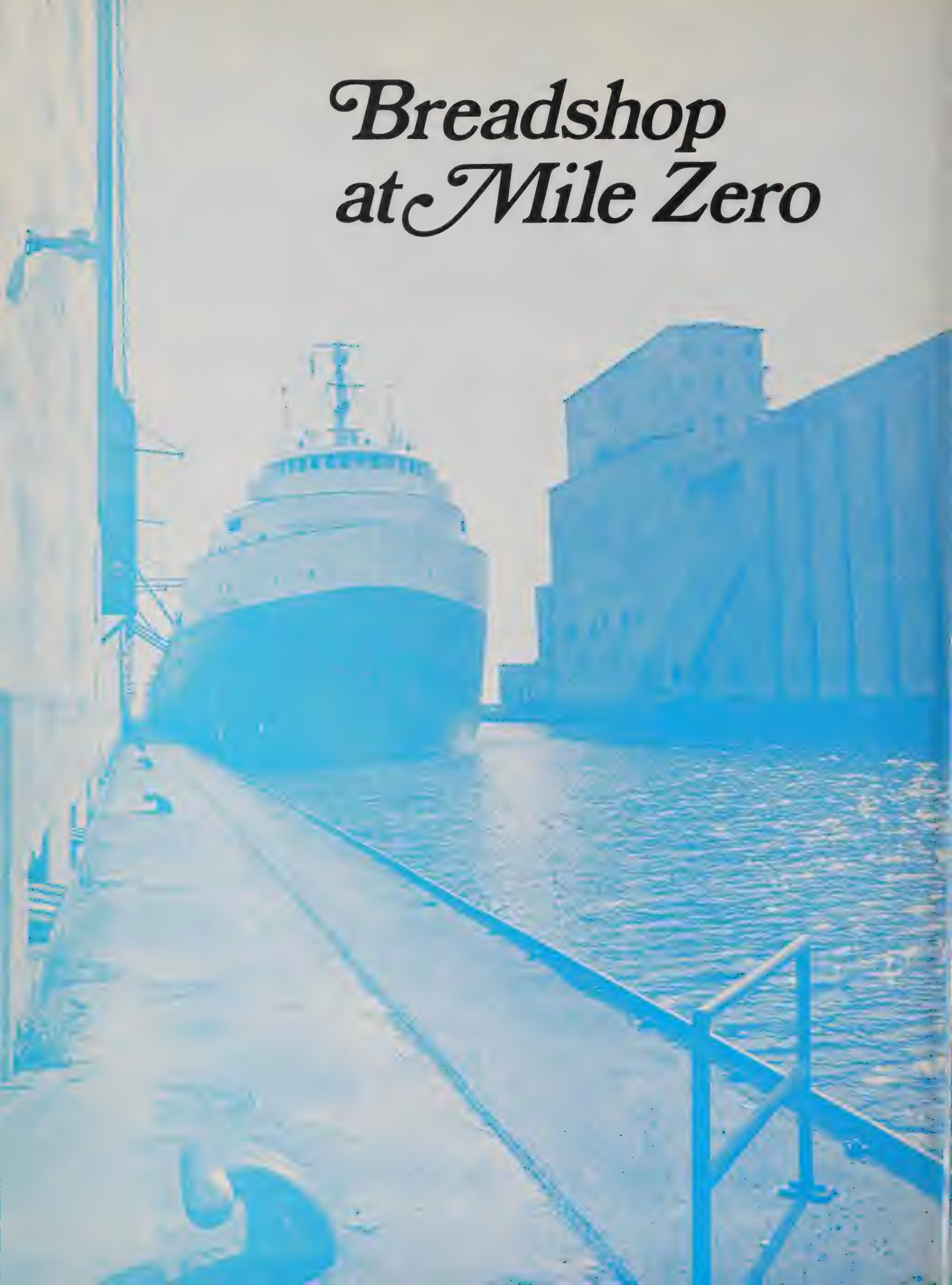
used to check credit rating and for billing. Later, the department will be linked to computer equipment which will enable an ad to appear on a TV screen for checking and editing.

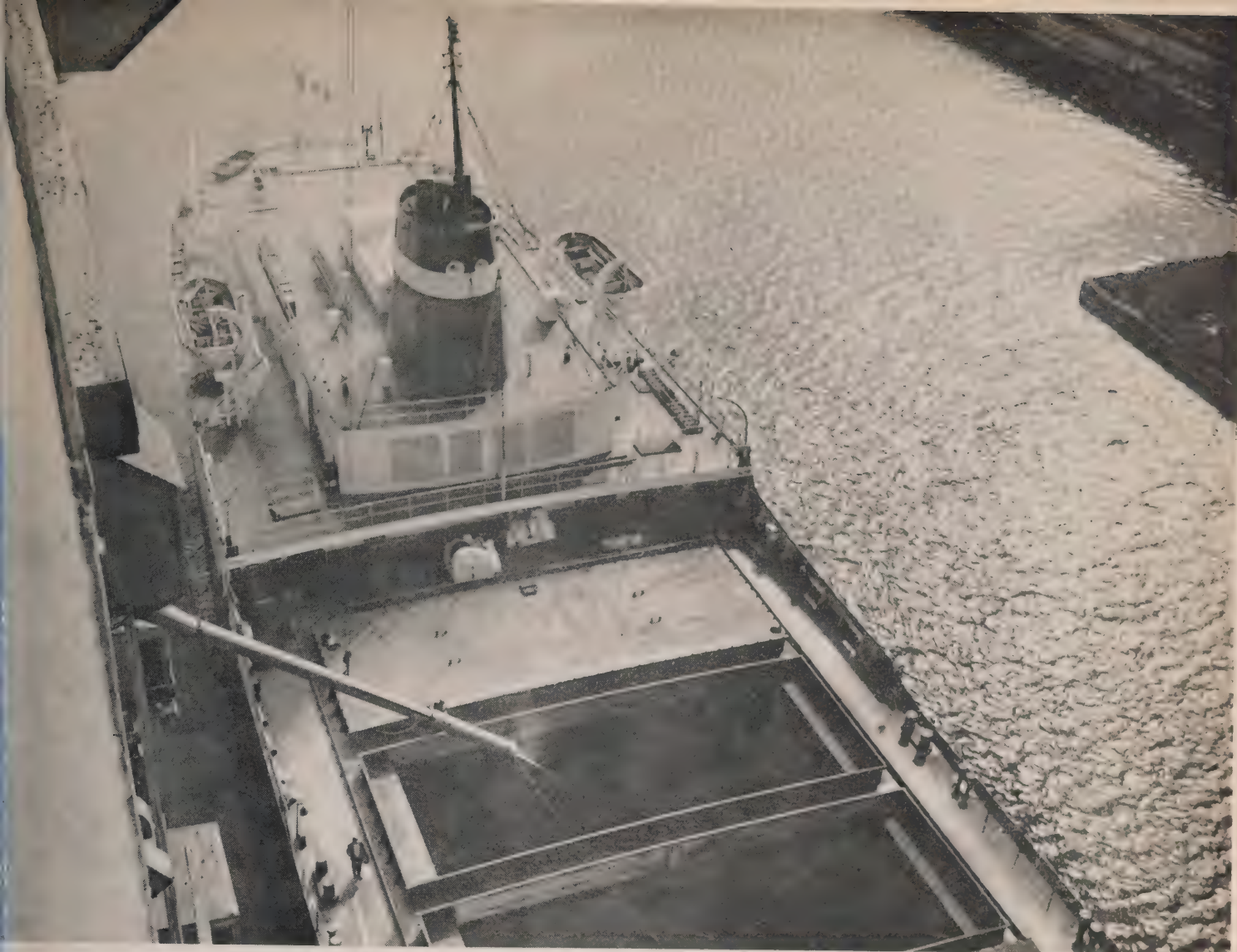
The classified ad department also has a new automatic call distribution switchboard, the only one of its kind in Canada, based on a system developed by the New York Times. There is no main switchboard. Calls are automatically routed to girls who are free.

It was at the Star that Ernest Hemingway cut his journalistic teeth. It was the Star that calmly produced Gerda Munsinger alive and well in Germany. It was the Star that located and photographed labor leader Hal Banks living on a boat in the U.S.

The Star is continuing to build on this great tradition. Far from yielding to the onslaught of the electronic media, it is using the opposition's very arsenal to prove that the newspaper is still the world's

Breadshop at Mile Zero





Rae Hopkins
Photos by Ron Brown

ships flying the flags of 19 nations arrived at "mile zero" last season, and laden with grain, weighed anchor for ports around the globe. In all, 143 ships came.

Well, 1,181 vessels flying the Canadian flag made Thunder Bay a port of call during the 1971 shipping season. And 79 foreign-registered cargo boats docked here, too. This year promises to be even better.

Whatever you call the Canadian Lakehead Harbor, it's "mile zero" on the St. Lawrence Seaway. It has also been described as Canada's mid-continental seaport and the western terminus of Great Lakes navigation.

Whatever name, Thunder Bay is the fourth largest tonnage port in Canada, behind Sept-Isles/Point Noire, Quebec, Montreal and Montreal. And with 24 grain elevators with a combined capacity of

more than 105 million bushels, the port is unrivalled for the amount of bulk grain shipped all over the world.

A bumper grain crop on the Prairies in 1971 resulted in a banner year at the Canadian Lakehead Harbor. A record 22 million tons of cargo moved through the port, 15.5 million tons of which was bulk grain. That was double the amount handled in 1969. And the Canadian Wheat Board, which arranges grain transport, expects all previous records to topple during the 1972 shipping season.

Saskatchewan Wheat Pool's Terminal 7, although by far the largest grain elevator at the Lakehead and one of the largest in the nation, is typical of the facilities here for dispatching yields to a world-wide market.

On a typical day, in the shipping season, a giant laker like the Canada Steamship Lines' Baie St. Paul, which measures 730 feet in length, 75 feet at the beam and has a

Canada Steamship Lines' Baie St. Paul will receive the yield of well over 50,000 acres of Prairie wheat before she sets sail from the Saskatchewan Wheat Pool terminal at Thunder Bay.

carrying capacity of well over a million bushels — a bushel of wheat weighs 60 pounds — will move into the channel and tie up alongside the elevator.

Her hatches will be opened and from spouts high up in Terminal 7 billions upon billions of grain kernels will pour into her holds.

It takes a farm yield of well over 50,000 acres to fill big carriers like the Baie St. Paul, and five trains totalling 566 boxcars are needed to transport the grain from the Prairies to Thunder Bay.

Terminal 7 was built in 1928 and even today is one of the fastest grain-handling plants in the world. There have been times when 800,000 bushels have been unloaded from boxcars and twice that much loaded simultaneously on to the big freighters in a single day.

Electric energy is the key to such performance. It takes 285 electric motors and a



Automation takes over when grain cars arrive at Terminal 7. Electrically-operated dumpers upend cars one way, then the other, until all 120,000 pounds of grain have been emptied.

load of 5,600 kilowatts to move the grain from boxcar to boathold. Electricity runs the cleaning equipment – every kernel must be thoroughly cleaned before it leaves an elevator – the elevating and conveying equipment, the belting which, if laid end to end, would measure about 7½ miles, and the car dumpers. The total load for all elevators is about 36,000 kilowatts.

Fully-loaded grain cars, which carry about 2,000 bushels, are moved into the work-house, fastened to the dumpers, and automation takes over. They're upended one way, then the other, and shaken and upended some more. The big machines jiggle the 120,000 pounds of grain and 30 tons of boxcar around like a kid playing with an electric train set.

From the boxcars, grain is automatically fed through a network of 75 machines and sieves for grading, cleaning, drying, and

binning. A random sample is taken from every boxcar and sent to the laboratory for analysis.

Scooping up a handful of grain for sampling, inspector Brent Murphy recalls the day when Terminal 7 employees unloaded a record 234 boxcars full of Saskatchewan wheat. He remembers the day during the 1969 season "when one of those big lakers left our dock carrying about a million and three-quarter bushels. That also was a record."

Terminal 7 is "the biggest single unit in North America and it takes a staff of 166 to run it," he adds.

Removal of foreign materials – they call it dockage in the trade – is done automatically and could involve the extraction of weed seeds, chaff, unthrashed wheat heads, dust, straw joints, wild oats, thistle

tops, stones and pieces of metal. Only grain goes into the holds of the vessel tied up at Thunder Bay.

Varieties are selected by kernel-length, kernel-width, and by the specific grade of the species. First, the grain goes through sieves of varying sizes. Or it may be fed through horizontal cylinders with openings of various sizes to allow only the proper size of kernel to pass through. Kernel is then sorted as to variety by a graduated suction system that separates them according to their specific gravity.

The whole process is supervised by inspectors of the Board of Grain Commissioners, and grain must measure up to board standards before it can be marketed. The regulations are stringent. But the Canadian wheat has a world-wide reputation to uphold. □

Weighman Wilson Barton, left, grades the grain and, below, inspectors Bert Murphy and Ed Hill examine random samples to ensure the grain measures up to federal standards. Photos by Ron Brown.





an island no more

The broad impact of Hydro, long a fact of life in Ontario, has now gained recognition under the intense scrutiny of a government-appointed task force. A likely result will be the reshaping of the Hydro enterprise in line with the changing social and economic scene.

As Task Force Hydro's wide-ranging studies near completion, a central theme is emerging: the activities of Ontario Hydro and the associated municipal electric utilities must become more interwoven with the Ontario government, which is developing new policies in the energy, environment, economic development and regional government fields.

This outcome should hardly come as a surprise in view of these factors:

- The Ontario government is currently going through a major reorganization as a result of recommendations of the Committee on Government Productivity.

- Private industry is becoming more closely regulated by government through tax reform, consumer protection and environmental legislation.

- Hydro's pervasive and expanding role in the provincial economy.

During the past 60 years, the growth of Ontario Hydro in meeting demands for electric power has been phenomenal. The 1971 annual report shows assets of \$5.06 billion, and total revenue of \$606.7 million. Average number of people on staff during 1971 was 23,264, including 6,793 temporary employees.

Between 1960 and 1969, Hydro's expenditures totalled \$1.97 billion. But the seven-year period between 1970 and 1977, Hydro will have to raise an estimated \$5.2 billion for its large capital construction program and debt retirement. Traditional financing has been achieved through the issue of government-guaranteed bonds.

Thus Hydro's need for borrowed funds cuts across provincial government efforts to reduce the rate of growth in provincial spending, as indicated in the recent budget, and to the extent that funds are raised abroad may impinge as well on federal government attempts to stabilize the Canadian dollar.

Hydro's requirements for fuel for generating power and for land to accommodate

...ns and transmission lines also lie within government spheres of interest.

General Manager D. J. Gordon, a member of the Task Force steering committee, has pointed out that because of Hydro's deepening involvement in provincial affairs it can no longer make major decisions in isolation, but must develop a closer working relationship with the provincial government.

It is most important to understand that the Task Force Hydro study was not initiated because of inefficiency or anything inherently wrong with the organization at this point in time. It was set up in the light of the changing social and economic scene, and new policies on energy, environment and industrial development. It has felt that Hydro must be equipped with optimum organizational structure to cope with changing requirements."

The task force, headed by a six-man steering committee, has undertaken the most intensive study in the 66-year history of Hydro. It reports to the provincial government through the Committee on Government Productivity and ultimately to the provincial cabinet.

Participating in the studies have been representatives of Ontario Hydro, municipal electric utilities, government departments and outside consultants. An advisory group was formed to obtain the views and advice of a cross-section of the public on Hydro's rates and power costing policies, and 131 submissions have been received from industry, small business, various groups of individuals in eight subject areas.

Task force representatives have also met with experts from other electric utilities in Britain, France, Sweden, the United States and Canada.

Task Force studies have reached the point where preliminary recommendations are being evolved and tested with senior Hydro staff members.

Though it's too early to discuss specific proposals, task force representatives have indicated their thinking in several important areas:

Ontario Hydro and the 353 associated municipal utilities will be asked to develop policies in concert with the government which will ensure an electrical generation and distribution system responsive to government policy encompassing a broader range of issues than has been formally recognized in the past.

Organizational changes, worked out in cooperation with Ontario Hydro personnel, are expected to enable Hydro to carry out redefined responsibilities.

— For the municipal utilities, J. Dean Muncaster, chairman of the task force steering committee, has foreshadowed the possibility of a reduction in their number in the province.

In a speech to the annual meeting of the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities on March 1, Mr. Muncaster, president of Canadian Tire Corporation, said:

"To date, we have not been convinced of the need for radical change in the role of utilities within the system. We have, however, been impressed by the necessity for some rationalization in the total number of utilities."

Andrew Frame, last year's president of the OMEA, is a member of the task force steering committee. The managers of the OMEA and AMEU are liaison officers. Briefs have been presented to the task force by the OMEA and a number of individual utilities.

Mr. Muncaster recently expanded on the task force concept of Hydro in Ontario as an instrument of government policy, particularly in such areas as return on capital invested, capital investment timing, stability of capital markets, energy policy, discriminatory pricing, environmental policy and cost effectiveness.

"All of these issues are of obvious concern to the government and to a greater or lesser degree may bear directly on the future operations of a publicly-owned utility such as Ontario Hydro.

"It is the government role to ensure that all policy issues are taken into consideration in establishing a consistent, coherent policy capable of implementation."

Mr. Muncaster said he saw Hydro's role as providing the necessary input and "expert advice" upon which policy can be based and to produce and distribute electric energy in support of this policy.

"The development of policy thus becomes a joint effort which is satisfactory to both," he said.

"Both government and the utilities must recognize that many of their policy decisions jointly impact on 'Mr. Citizen' and these decisions cannot be made in isolation if 'Mr. Citizen' is going to be adequately served."

The task force studies are inter-related with the work of the Ontario Advisory Committee on Energy headed by Dr. John Deutsch, Queen's University principal and past chairman of the Economic Council of Canada, which is drawing up long-range energy policy for the Ontario government.

The advisory committee, formed on July 22, 1971, includes senior government officials, representatives from Hydro and from the gas, coal, oil, propane, chemical and nuclear industries.

Hydro members are Chairman George Gathercole and Dr. R. H. Hay, of Kingston, a past president of the OMEA.

The committee is making a wide-ranging study of the whole question of energy use and economic growth in Ontario.

As outlined in the Speech from the Throne on March 30, 1971, "the government is determined to assure the adequacy of our energy supplies in the future.

"It will ensure that the energy is used as efficiently as possible and that its use will not adversely affect the environment, health or life. The government will strive to maintain a choice between the various types of energy to match them with those uses for which they are best suited."

The advisory committee has provided preliminary information to assist Task Force Hydro in its studies but its main work, which will include a forecast of Ontario's energy needs to 1990, is scheduled to be completed by Sept. 1. It is expected to help in defining Hydro's future role in the overall energy picture.

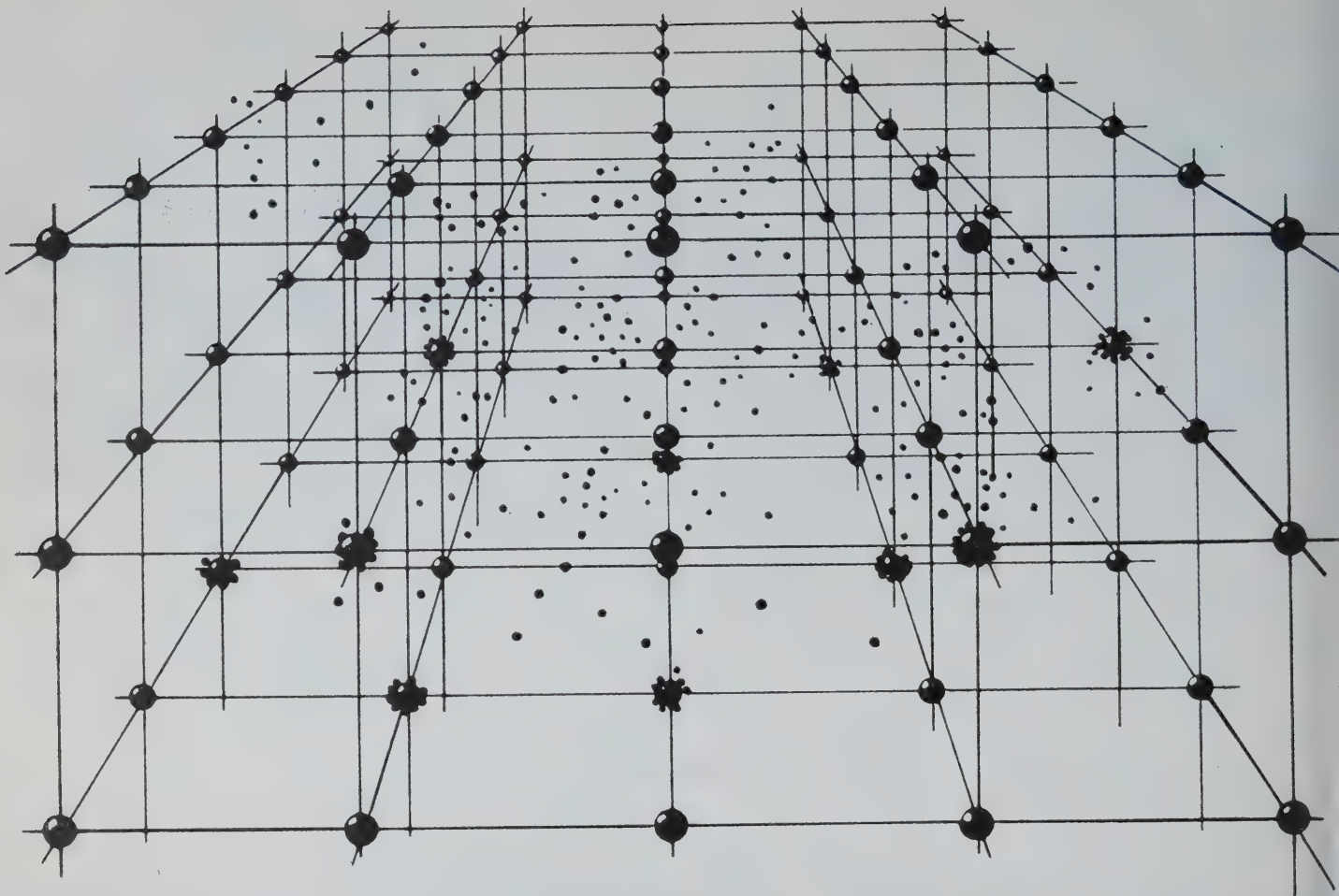
Whatever changes may come, they will undoubtedly present challenges for Ontario Hydro and the municipal electric utilities to fulfill their new mandate from the government of Ontario.

Mr. Muncaster has pointed out that Hydro has long conducted its operations in support of government policy. "But . . . growth and changing social and economic values and conditions," he said, "are making this process even more complicated and difficult to deal with efficiently. Hopefully, a clear definition of these responsibilities will be among the results of Task Force studies.

" . . . key Hydro personnel have been involved at all levels of our studies and any policy which is developed will be consistent and implementable to the degree necessary for the efficient operation of the Hydro system — free from day-to-day interference or intervention."

The task force has set a time limit of one year on its studies. When recommendations are approved by the provincial cabinet, the task force plans to assist in translating them into actual practice.

In a recent address, Hydro's general manager stressed the need for staff members to be receptive to new policies and procedures. "We should welcome change as a challenge," he said, "and regard it as the key to a bigger and better future." □



anatomy of an energy policy

"A blueprint for a mature energy policy which can be integrated with the overall policies of the government for the benefit of the people of Ontario."

That's the weighty task set out for the Ontario Advisory Committee on Energy by Premier William Davis in a statement to the legislature last July 22.

Since then, ACE has undertaken wide-ranging research into many facets of the knotty problem of energy supply and economic growth. As indicated in the accompanying article, its work is closely related to the Task Force Hydro studies which are now nearing completion.

An important task will be to develop energy forecasts for the next three decades in the

context of the world, North American, Canadian and Ontario outlooks.

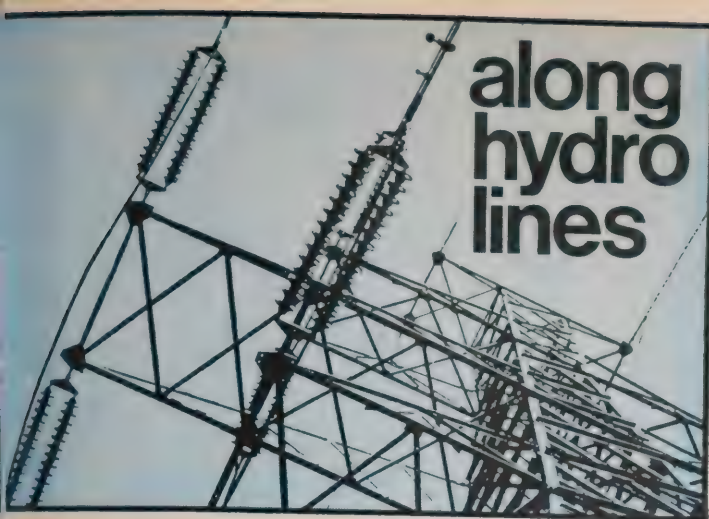
Illustrating the scope of ACE are investigations into the possibilities of gasification of Northern Ontario lignite, energy storage devices for off-peak periods, new modes of urban transit, electrified railroads, alternatives to the internal combustion engine, and changes in domestic heating systems.

Another aspect is a 20-year forecast of technological changes which will affect the production of energy. This study is focussing on possible developments in the fields of fossil fuels, hydro-electric power, nuclear fission, nuclear fusion and solar energy.

A key part of the total program will be to assess the impact of environmental protection policies on energy use. Special studies include a review of energy taxation, the relationship between Ontario and Canada in energy policy and regulation.

Executive director of the committee is S. W. Clarkson, Deputy Minister of Energy who has specialized in the energy field with both the federal and Ontario governments. A senior representative of the Federal Department of Mines and Energy Resources, G. M. MacNabb, serves the committee in a co-ordinating capacity.

In developing a provincial energy policy, Premier Davis has pledged to "work with the federal government in the interest of all Canadians." □



along hydro lines

Waste pact

The Ontario government and Goodfellow Combustion Ltd. have signed an agreement which provides for the building of a long-delayed industrial liquid waste treatment facility in Mississauga. Goodfellow Combustion has just been bought by Canadian Industries Ltd. The proposed plant will be capable of handling 20 million gallons of liquid waste a year.

To be designed by Trecon Ltd., of Mississauga, the plant will break down unwanted and environmentally harmful industrial wastes into safe compounds for disposal. It is hoped the plant will eventually be able to recycle useful by-products for marketing as industrial chemicals.

CIL will contribute a variety of patented processes, research facilities and technical services in industrial waste treatment. Some of the waste fed into the plant will be decomposed thermally to provide stable products for recycling or disposal at approved sanitary landfill sites.

Other wastes will be processed physically in liquid form and some will be oxidized biologically in a manner similar to normal sewage treatment.

The plant is expected to be operational by the end of the year.

Public ownership probe

Alberta's Utilities Minister Len Werry has indicated that the Alberta government plans a comprehensive power policy review which will include consideration of a publicly-owned electric system for the province.

Mr. Werry pointed out that Alberta and Prince Edward Island are the only two provinces which do not have a publicly-owned utility commission partly or wholly responsible for the production, distribution and sale of electricity.

Alberta Power, the largest utility in Alberta, plans capital expenditures over the next five years of \$210 million. Included in the plans are two additional 375,000-kilowatt units at the Fort McMurray plant, west of Edmonton.

In Nova Scotia, the provincial power commission says it has purchased about 99 per cent of the ordinary shares of Nova Scotia Light and Power Co. Ltd. It has also purchased about 99 per cent of the company's preferred stock.

The structure of the new provincially-controlled corporation has yet been determined, but it's reported that the company and the Nova Scotia Power Commission will be merged, with the commission surviving.

The province is understood to be considering the creation of a new energy board which would bring all energy matters, including possible tidal power generation and the distribution of natural gas together with electric utility operations, under the board's jurisdiction. □

Keep it beautiful

When Ontario's new permanent licence plates are issued next year they will carry the message, "Ontario - Keep It Beautiful," says Environment Minister James Auld.

Mr. Auld says the theme not only reflects the widespread and growing concern for the province's environment, but it will also serve as a continuing reminder that a clean environment is an individual responsibility.

"The message will remind visitors and potential tourists that Ontario is a beautiful province whose people are concerned with conserving and enhancing its natural attractions," Mr. Auld said.

He pointed out that nine of Canada's 10 provinces and many U.S. states "send their messages on licence plates wherever people travel by car." □

Air quality director



Colin J. Macfarlane

Colin J. Macfarlane, 44, has been appointed director of the Ministry of the Environment's air quality branch. He succeeds W. B. Drowley, recently appointed executive director of the Ministry's air and land pollution control division.

Mr. Macfarlane was assistant director of air management before the Department of the Environment merged with the Ontario Water Resources Commission to form the Ministry of the Environment. He joined air management in 1967 as a district engineer.

Born in Paisley, Scotland, Mr. Macfarlane came to Canada in

1955. His engineering career here includes a three-year period as radiation hazards control engineer at Atomic Energy of Canada Limited's Chalk River Nuclear Laboratories. During that time he was responsible for developing new radiation detection devices and for enforcing safety rules. □

'Procedural nightmare'

Enforcement of the U.S. National Environmental Policy Act has become a "procedural nightmare," says Federal Power Commissioner Pinkney Walker.

Calling on Congress to adopt more reasonable standards, Mr. Walker said the procedures, at least as interpreted by the courts, require such a large volume of paper and analysis as to make the decision process never ending.

Perhaps the most important new dimension in utility regulation is the impact of environmental issues.

Mr. Walker said he accepted the goals of the National Environmental Policy Act as being essential, without compromise and long overdue. "However," he added, "these objectives could be achieved sooner and at substantially less cost to society if more reasonable procedural standards are adopted."

"We are confronted with a trade-off between increases in material wealth and environmental quality. However, it is a mis-

statement to portray our choice as a trade-off between economic welfare and environmental protection. Economic progress, properly defined and measured, would fully reckon and weigh in the scales the environmental pluses and minuses that are a part of the growth process.

"In the future," Mr. Walker said, "these costs must be taken into account in decision making and the net results must be reflected in our measures of economic performance. Only then can we realize an appropriate pattern of resource allocation and an appropriate accounting for environmental effects.

"This means that in the future, when we buy so many watts of electricity, we will also be buying so many cubic feet of clean air and so many cubic feet of clean water, which is as it should have been long ago." □

Metric conversion

It's estimated that conversion to the metric system in Canada will take somewhere between five and 20 years, mainly because of the costs involved.

However, some countries with experience, India, the U.K. and Japan, have found actual costs for conversion of machine tooling in industry to be far less than originally estimated. In India, the cost was only one-tenth of the original estimates.

Wide variation of opinion as to the length of time to switch to the metric system in Canada stems from two main reasons. For a particular industry, there must be economic gain. Where there is a large demand for metric products, the tooling change costs can quickly be absorbed. In other cases the change will be more gradual and obsolescence or wear factors will be the major consideration.

However, one U.K. firm says its retooling costs were recovered through one export order. Others have reported the cost of changeover during the five-year transition period was approximately 0.5 per cent of the annual sales. If costs should average as high as 1 per cent of annual sales during the five-year transition period, the total cost would be in the order of £400 million, whereas there had been estimates of as high as £5,000 million.

Says H. M. Robinson, secretary of the Canadian Standards Association's metric advisory and metric practice guide committees: "General surveys to determine possible conversion costs in Canada aren't worth the effort. Each specific industry will have to assess its own export market potential and decide when and at what rate conversion should be programmed."

Meanwhile, the optical and pharmaceutical industries, along with hospitals, are well on their way to metric usage in Canada. Considerable work has been done in the wood products and paper industries and various exporters in all fields have produced items suitable for export to metric countries.

The CSA plans to start rewriting about 1,200 standards into metric sizes next year. □

Stepping down

After 28 years of service with Tillsonburg Public Utilities Commission, Stan Webster, its secretary-manager and 1965 president of the Association of Municipal Electrical Utilities, is retiring.

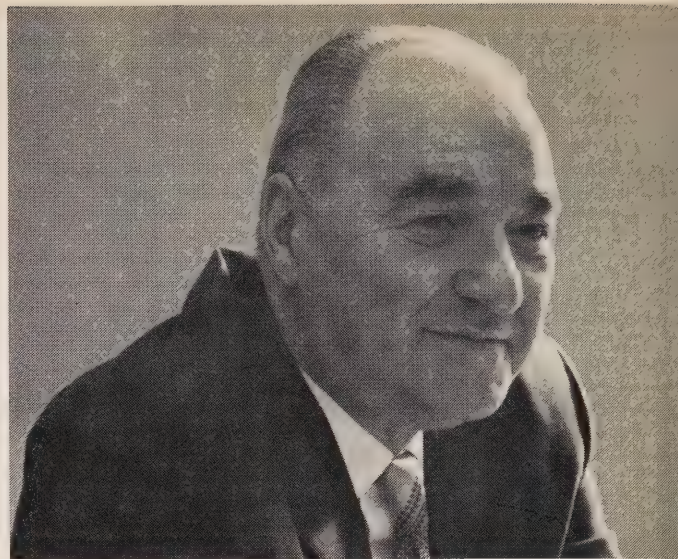
He is succeeded by John Middel, who for the past eight years has had a similar position with Harrow Hydro.

Mr. Webster began his utility career with an Ontario Hydro line crew in Woodstock in 1925. He stayed with Hydro until 1944, serving in both Ingersoll and London areas before accepting the secretary-manager's position with Tillsonburg PUC.

During his tenure in the southwestern Ontario tomato belt, Mr. Middel served as Harrow and district industrial commissioner and is a past president of the town's Chamber of Commerce.

Born in Holland, Mr. Middel emigrated to Canada in 1949 and received his Canadian citizenship in 1954. □

Harry Hyde retiring



Unswerving loyalty



Ralph Bishop



Bruce Prentice

In 1924, a young student engineer went to work for Toronto Hydro while he was completing his degree at the University of Toronto. Now, 48 years later, Harry Hyde, one of the best-known names in the utility business in the nation, is retiring as the utility's general manager and chief engineer.

He will be succeeded by assistant general manager Bruce Prentice. Ralph Bishop, director of management services, has been appointed assistant general manager.

Mr. Hyde joined Toronto Hydro as a general distribution manager responsible for the design and development of the utility's low-voltage network. The directness of his approach to solving problems has somehow been reflected in his climb from the distribution department to the general manager's chair.

Harry Hyde's approach to personnel problems has always been positive, tempered by an intense interest in people and a deep understanding of human nature. He keyed his philosophy on loyalty, gave it unswervingly and expected as much in return.

As general manager, Mr. Hyde has been continuously identified throughout the country as an authority on power distribution and its associated problems. Not only Toronto Hydro but the entire industry has benefited from Mr. Hyde's ability to foresee problems and resolve them.

Bruce Prentice joined Toronto Hydro's distribution department in 1949, following graduation from U of T in electrical engineering. In the early 1950's he was deeply involved with the free standardization program undertaken by Ontario Hydro.

In 1957, Mr. Prentice was transferred to the utility's executive

Department and a year later appointed executive assistant, engineering. He was appointed assistant general manager, engineering, in 1959 and assistant general manager in 1963.

Ralph Bishop also joined Toronto Hydro in 1949 following graduation in electrical engineering from U of T. He progressed through the station construction, station planning and design and service maintenance departments prior to his appointment as director of management services.

As director of management services, he has played an active role at the bargaining table, in the grievance procedure and at employer-union committee meetings.

The new appointments and Mr. Hyde's retirement become effective in August. □

Gas for controls

Michigan health official has told federal Environment Minister Jack Davis that Canada should sell natural gas supplies to Michigan in return for better air pollution control.

Morton Sterling, director of the Wayne County air pollution control division, has suggested that Canada make available low sulphur fuel to specific industries near the border so they can reduce air pollution by converting to natural gas.

Windsor is being seriously bothered by air pollution from the U.S. side of the border. Industries on the Canadian side have made major reductions in the degree of pollution they are causing, but little progress has been made on the U.S. side. □

Plants too big

The International Atomic Energy Agency says the size of nuclear power plants being ordered from manufacturers by developing nations is larger than many of them need, or can fit into their electrical networks.

IAEA is therefore surveying developing countries to determine their plans for nuclear power during the next five to 15 years. Countries will be asked for data on national energy needs, resources and costs, organization of the electric power industry, historical and projected load growth, planned generation and transmission expansion programs.

The survey is aimed at seeing how nuclear power will fit into the countries' energy programs. □

Cost cut seen

Fuel bundles for CANDU reactors are expected to drop 50 per cent in cost by the mid-1980's, a study by Atomic Energy of Canada Limited vice-president L. W. Haywood has shown.

The expected price reductions will come from larger scale fuel bundle production.

Mr. Haywood estimates that by 1985 the demand for fabricated fuel will be 1,500 tons a year and predicts a cost of \$17 per kilogram of uranium compared to today's cost of \$30 a kilogram.

Other potential savings could result from development of alternative economic materials and substitution of compounds having a higher uranium density than the fuel now being used. □

Frankenstein gauge

A custom-designed air gauge, resembling something out of Frankenstein's lab, is passing final judgment on end fittings for the nuclear power plant and for a nuclear plant under construction in India.

Employees of Donlee Manufacturing Industries Ltd.'s nuclear group treat the highly sophisticated gadget with a great deal of

respect. If its multi-colored calibrated columns come up with the right results, end fittings pass their final hurdle before delivery.

But if the gauges show deviations beyond minute tolerances, the fittings would be rejected.

Standing against a wall in a well-lighted inspection room, the \$120,000 gauge has been dubbed the Supreme Court. A poor reading off any one of the testing columns could cancel out a lot of work.



Precision job

Red-colored columns ensure the gauge is square to the end fitting face. Sixteen orange-colored columns determine pitch length, which means that all locking lugs inside the fittings must be within plus or minus 7/10,000th of an inch of each other.

And the gauge applies other tests, too. Keyway positions are checked, scallop and pressure angles are examined.

As an indication of the precision work involved, locking lugs must protrude exactly 3/16 of an inch from the inside of the barrel face and all 16 of them must measure exactly six inches in diameter and they all must be three-quarters-of-an-inch apart. Even the slightest variance will show up on the gauge.

The Bruce plant will require 4,000 end fittings and 200 have already gone out to the Indian government. An additional 450 are still to be exported.

End fitting chrome plating has a thickness of only one-half of 1/1000th of an inch. Getting a smooth application, particularly on the inside of the locking lugs, is a complicated process but 1,400 of them are scheduled for delivery this year anyway. □

Utility business aired

Utility people from across Northwestern Ontario heard a panel of experts discuss metering practices, power costing and rates. There was also a panel quiz on various aspects of the utility business.

The event was the annual meeting of District 3 of the Association of Municipal Electrical Utilities. More than 50 utility managers and senior personnel attended the Thunder Bay get-together.

Panelists included Roy Oakley of Thunder Bay Hydro, Andy Wepruk, Fort Frances PUC, Jack Hamer, Ontario Hydro's Thunder Bay area manager and Bob Minaker, Sioux Lookout Hydro manager. Marv Kelly, Atikokan Hydro manager and AMEU district director, served as moderator.

Martti Isotalo, of Thunder Bay, was elected district president for the coming year. Other officers include Evald Ounpuu, Thunder Bay, past president; Sam Marcus, Fort Frances, vice-president; Colin Nicholson, Thunder Bay, secretary-treasurer, and Bill Hanley, Terrace Bay, Jerry Miaskiewicz, Kenora, Frank Capello, Thunder Bay and Bob Minaker, directors. □

Lesson well learned



Practice pays off

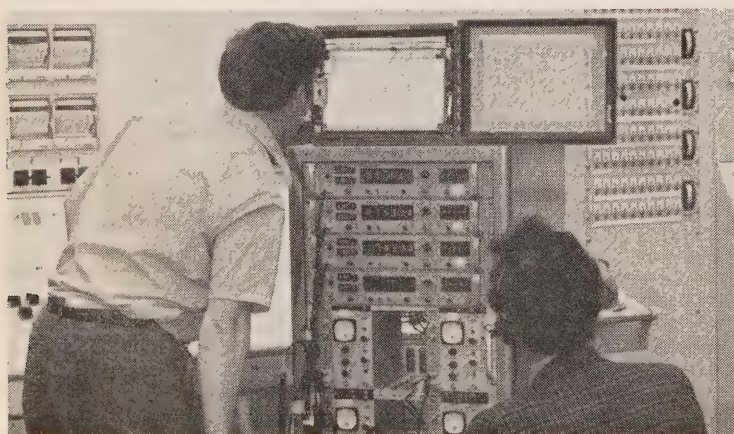
Last September 7, Ontario Hydro Welland area linemen Sandy McDonald and his partner Walter Jazvac attended an artificial resuscitation practice in the morning. In the afternoon Sandy had a chance to put it into practice and saved Walter's life in the bargain.

While working together on a line near Highway 57, Walter received a severe electrical shock and fell from a ladder truck. He had stopped breathing.

Without a moment's hesitation, Sandy started applying the Schafer method of resuscitation. He never had a more vital job to do in all his working career. After two-and-a-half minutes the victim started breathing and was taken to Welland Hospital.

Sandy is shown receiving the Canadian Electrical Association life-saving medal from Hydro's assistant general manager—regions and marketing, D. B. Ireland. □

11 o'clock news



Away she goes

The time was 11 p.m. April 24, 1972. The late night news came on the television networks. But to a few people in the control room at Pickering nuclear power station the news was even better.

The reactor for unit 3 started up at 11 p.m., exactly one week ahead of schedule. The next major stage in bringing the unit into commercial production, first steam to the turbine, occurred just five days later.

Three weeks between start-up and first steam were planned for unit 1 and a week was trimmed off that timing for unit 2.

Meanwhile, 13 nuclear power plants in the United Kingdom have now produced more than 200 billion kilowatt-hours of electricity. This far exceeds the nuclear power output of any other nation in the world (Soviet Union excluded) and represents 47 per cent of the world's nuclear generation.

During the first quarter of 1972, electric utilities in the U.S. have announced plans for eight nuclear units with a total capacity of 8,573,000 kilowatts to be located at seven power stations.

Reactor suppliers have already been selected for two units, and for three units announced in 1971. In the first quarter of last year, utilities made known plans for five nuclear units with a 5,006,000-kilowatt total capacity at four stations. Reactor suppliers were selected for four of the five units in the first quarter.

At the end of March there were 23 operable nuclear power plants in the U.S., producing a total of 10,007,000 kilowatts, 54 per cent under construction with a total output of 45,794,000 kilowatts and 57 additional planned with reactors already ordered, for a total additional nuclear power output of 56,702,000 kilowatts.

When the 54 nuclear power plants under construction are completed and the 57 planned stations are on the line, there will be 134 nuclear power plants in the U.S. with a combined capacity of 112,503,000 kilowatts.

Back in Ontario, the first unit at the coal-fired Nanticoke generating station under construction on the shoreline of Lake Erie has been brought up to its full 500,000-kilowatt output during a trial run.

municipal briefs

Newburgh village councilors have gone on record as showing their appreciation to recently retired Hydro supervisor Frank Smith for his 22 years' service to the community. In a motion the councilors declared they were "sure that we express the sentiments of the great majority of Newburgh Hydro customers when we acknowledge publicly Frank Smith's contribution and sincerely thank you for a job well done beyond the call of duty. It was Jack Lightbody day around Lindsay Hydro April 24, 1972 was the day the utility's commissioners set aside to pay tribute to the man who guided the affairs of commission for 27 years. Mr. Lightbody is now a town councillor.

Guelph City Council and the Board of Light and Heat Commissioners have reached agreement on a policy to bury overhead power lines in the central business core. Work will be done in stages over several years and will go hand-in-hand with a city sidewalk replacement program. As new sidewalks are installed, duct work will be installed for underground lines, at the expense of the city. The Heat and Light Board will transfer lines under sidewalks at a minimum rate of one street a year at its expense. The plan calls for the city to pay for new street lighting poles which have been buried.

A 23-year Ontario Hydro employee, W. D. Hobson, has been appointed manager of Hydro's Brockville area office. Mr. Hobson spent 10 years in various area jobs after joining Ontario Hydro in 1949 and was appointed Eastern Region residential supervisor in 1959. He was named consumer service supervisor in 1965, a position he held until his appointment as area manager.



as don wright sees it

Faraway fields may look greener, but think twice the next time you suggest giving his country back to the Indians. According to the elaborate tabulation and interpretation of social indicators from 14 leading countries compiled by *The Economist*, Canada comes out as the pleasantest place to live by half a dozen lotus leaves.

The tabulators took into consideration such plus factors as higher education, dwellings with baths, car ownership, early marriages and economic growth. Among the nasty minuses were the number of murders and suicides and high population density.

Divorce rates were given a negative value on the grounds that they denoted social tension. Had they been considered as a positive indicator of a liberal society, the U.S. would have won out as the land of milk and honey.

While Canada's convincing win may be comforting, there are some disturbing aspects. Why, for example, did we take such a scrubbing from Australia and the United States in the prestigious area of dwellings with bathtubs?

We were second from the top in the number of murders, but there again we were soundly thrashed by the U.S. which was out in front by a country mile.

Fortunately for our side, the indicators did not include a column on mean temperatures. None of the countries concerned can boast temperatures any meaner than ours and as *The Economist* pointed out, on the basis of the indicators chosen, the South Pole could eventually run off with the whole bowl of cherries. It's hard to score high on low population density, freedom from auto accidents and early marriages. Nor does there appear to be any disposition toward divorce, murder or suicide among the penguin population.

Self-survival courses are not new and the procedure is well known. Usually it involves dropping some poor wretch into a blackfly infested muskeg clad only in a string and a pair of carpet slippers. The

object is to survive for a week or so from a kit consisting of a bent pin, two pieces of flint and a copper wire. Hydro is trying to do something similar, but its approach is more practical.

Electric living consultant Gillian Hanks, of Northeastern Region, is giving a four-week course designed to enable new husbands to survive and young singles to make their own way without starving, dying of indigestion or doing themselves in through a lack of familiarity with things electrical.

Her topics include basic cooking skills, menu planning, grocery shopping, the selection, use and care of appliances and the basics of such devices as plugs, fuses, switches and the like.

By and large, we'd have to admit her curriculum is more likely to lead to survival in this day and age than the ability to build a wigwam or brew tea from the liverwort root. All of which reminds us of the terrible old joke about the Indian who drank too much tea and drowned in his own teepee.

■ One thing about the people who have to sell the public on the safety of nuclear plants from the radiation point of view — they're ingenious and persistent.

One veteran U.S. congressman has discovered that the brick, granite and other stone of which the various government structures in Washington are composed emit radiation considerably above the natural occurring background levels for the geographical area in which they are located.

Hottest item on Capitol Hill is the granite base upon which rests the statue of Jesuit missionary Eusebio Francisco King. The read-out level beneath the good brother's feet is 330 millirem per year above background.

The congressman points out that he and his colleagues are expected to carry on under these high radiation conditions while a person would have to live near the fence of a nuclear station for a solid year "to pick up the crummy 5 to 10 millirems above background that some people seem unwilling to trade for an adequate supply of electricity."

The congressman does admit that he and his fellow baby kissers may not have escaped entirely unscathed from beneath the padre's feet. Among the symptoms he suspects may be due to excessive radiation are fuzzy thinking, propensity toward long sessions of nonsensical talk, excessive vanity, stubbornness and delusions of grandeur.

"So you see," the congressman concludes, "the U.S. Capitol may be an awesome radiation hazard after all, but I

do not recommend abolishing it — it could cost me my job."

■ One of the most reassuring statements we've heard to date on the subject of radiation is that beer contains radioactive potassium. A single can, we are told, houses about the same amount of radiation as we are likely to receive in a year from our nearest friendly nuclear station.

We are thinking, of course, about Uncle Charlie. If the beer bit is true, he's been exposing himself to radiation roughly equivalent to that produced by a 20-megaton bomb exploding every two weeks in his bedroom closet. And he's still in great shape — except for a tendency to glow a bit in the dark.

■ As a final word on things with a nuclear connotation, we might bring our readers' attention to a paper prepared jointly by two AECL people. We can't vouch for the contents, but the title is sufficient to pique one's interest. It's called, "The stress gradient in a freshly packed stuffing box."

■ We continue to be amazed at the misconceptions which exist relative to the weird and wonderful properties of electricity. These include the theory that high-voltage current has a highly-corrosive effect on metal and that vehicles and farm implements parked in the vicinity of power lines are likely to be so affected.

Another fairly common delusion is that 'radiation' from high-voltage lines has a deleterious effect on human life. One lady recently asked if the current would affect the reproductive systems of animals grazing beneath the lines. She was satisfied when Hydro explained that its linemen, who often work in the immediate vicinity of live lines, have a very respectable record of prolificacy.

We hasten to add that this capacity is in no way due to any electrical emanations. There is absolutely no evidence to suggest that residents living in the vicinity of these lines tend to enjoy larger families.

■ All the way from Georgia comes the allegation that we were way off base last month in suggesting that we all start blowing bubbles to aerate our lakes and rivers and thereby reduce pollution.

"We consumers of french fries and hamburgers south of the border generally exhale carbon dioxide, not oxygen," this gentleman points out. "Have we been doing it wrong all these years?"

Anyone knows that if one blows hard enough into a body of water, one creates turbulence — thus trapping tiny air pockets which certainly do aerate the water.

Maybe our southern neighbors just can't blow hard enough. We did say maybe. □



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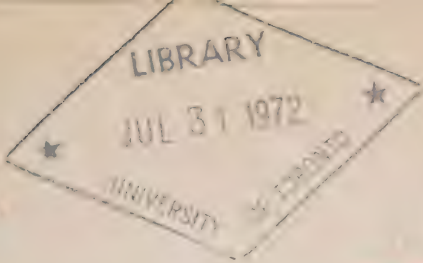
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Photo by Harry Wilson

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to all our readers

Due to a change in publishing policy, there will be no July–August issue of Ontario Hydro News. The magazine will next be published in September, and will appear every two months from then on.

ontario hydro news june 1972

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hydro news, volume 59, number 6

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time for a change

Five centuries before the birth of Christ, the Greek philosopher Heraclitus said, "Nothing endures but change." Heraclitus should be alive today. At no time in the history of man has change, spawned by breakneck technology, followed change in such rapid-fire and bewildering fashion. Many of the old traditions and social mores have been upturned. Society has become more eruptive, critical, fluid.

Survival will depend on the ability to adapt. Society is speaking out in its new found freedom and with the realization that it has the power to weave a new fabric of values. The course of wisdom is to listen.

Hydro is no exception. External pressures are mounting as the affairs of this rapidly growing organization impinge more and more on areas of concern to the new society. Awareness and the capacity to respond are qualities being given high priority as Hydro gears to develop a power system which will satisfy the public need into the 1980's and beyond.

As a major medium of communications with the public, Ontario Hydro News must also be responsive. It must be objective but interpretive in its approach to such primary issues as pollution, transmission line technology, property acquisition, fuel selection, rates and nuclear power. It must keep up with trends in printing and design.

The next issue of the magazine, in September, will incorporate some fairly substantial changes. It is being completely redesigned. Its articles will be a little more specialized; its writing a little more interpretive. To permit this new approach, Hydro News will be published every two months commencing in September.

We believe the new Hydro News will appeal to those people in the provincial organization and the municipal utilities whose life and work is Hydro. We also believe it will appeal to those less directly involved in the energy business – and they are many. It will still be written in non-technical language. But we feel the technical people will want to read it, too.

See you in September. □

THE ICE SPRINKLERS

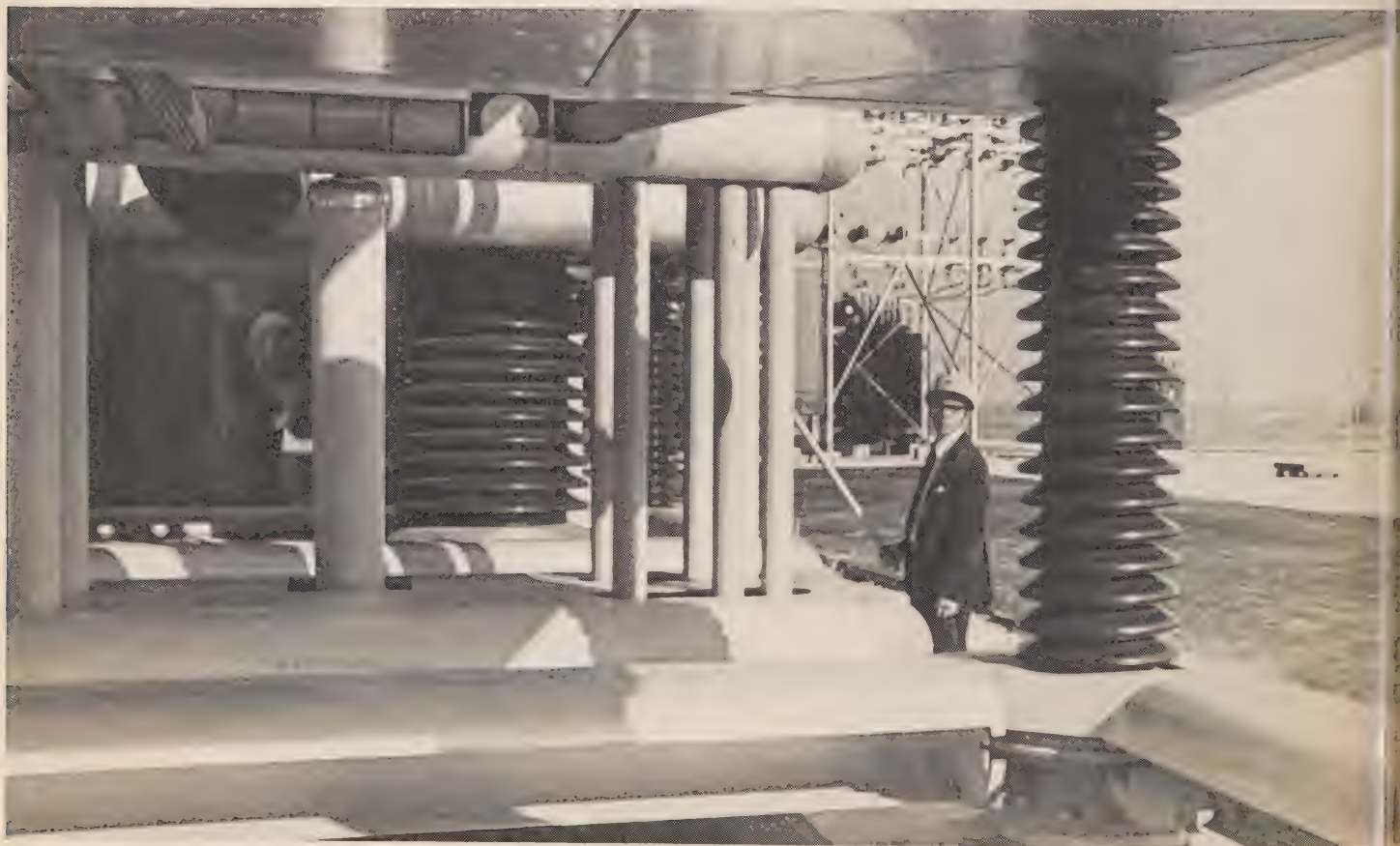
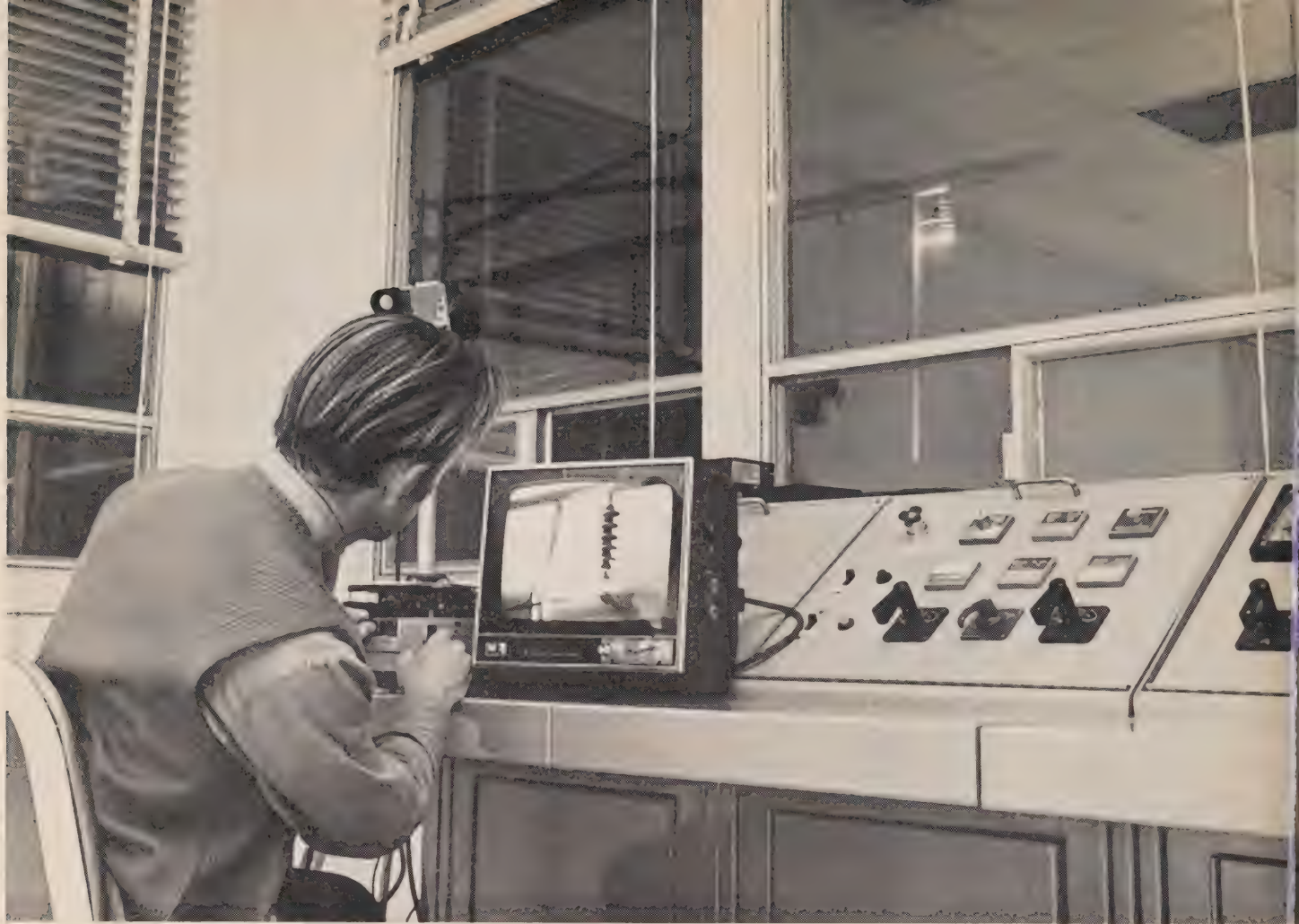
by Bill Settatree

One morning last March, Olaf Nigol rolled over in bed and turned on his radio in time to hear that snow, sleet and freezing rain were making driving hazardous.

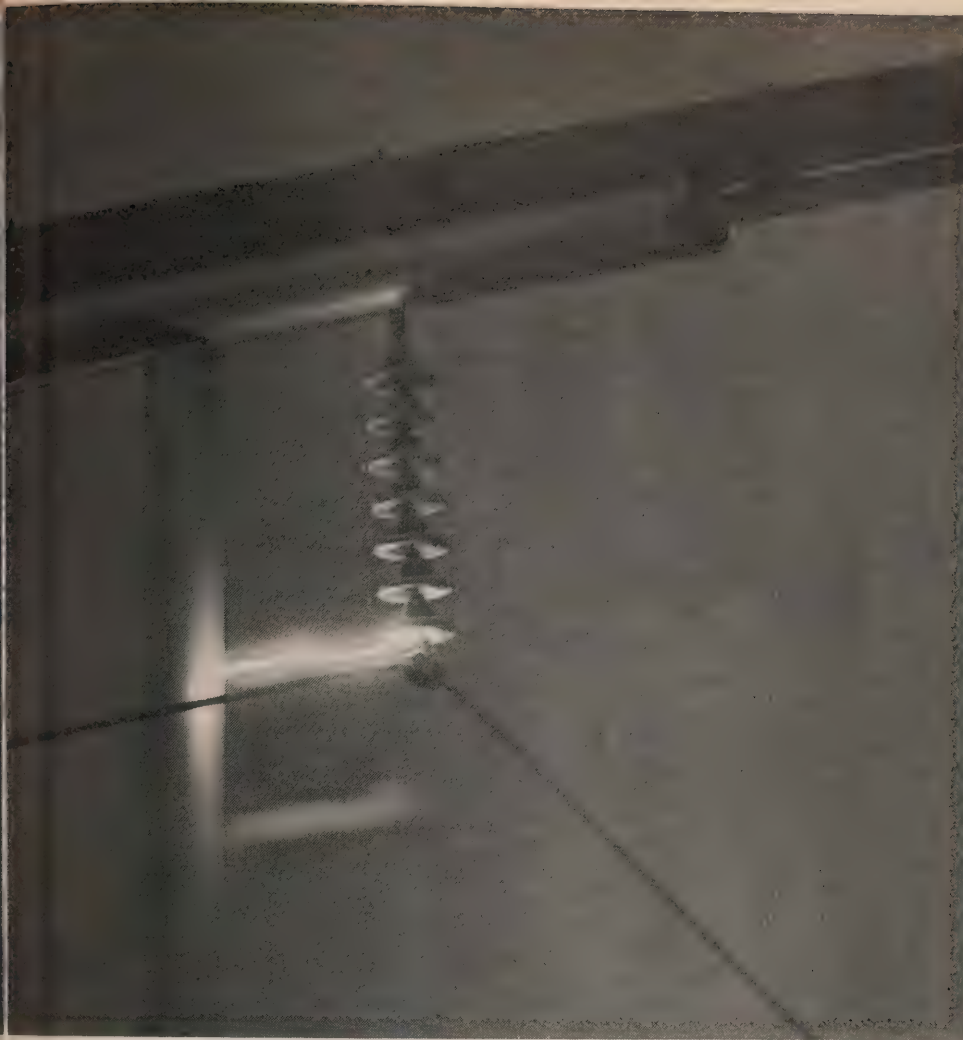
It was the kind of weather that would tempt most people to stay indoors. Not so Mr. Nigol. He and 13 other members of Hydro's research staff had waited all winter for just such a day.

They needed severe icing for experiments at Kleinburg, near Toronto, into the "galloping" of conductors. Under certain ice and wind conditions, transmission lines tend to thrash around or gallop, short-circuiting themselves or even breaking as a result.

The research group is divided into four "galloping patrols" on call 24 hours a day.



Simulated lightning strikes on an insulator assembly at Hydro's Kleinburg test facility are recorded on videotape. Bottom left, researcher Al Reed inspects the surge generator, which can also be seen clearly from the control room at right.



to visit test lines fitted with experimental damping devices aimed at curing these oscillations

Research into the galloping phenomenon is only part of the work of the Kleinburg facility, which also includes a multi-million-volt generator capable of simulating the tremendous electrical surges which sometimes flow through transmission lines as a result of lightning strikes or equipment failures.

The Kleinburg equipment is used to test power line insulators and study various transmission line configurations.

The ultra-high-voltage laboratory and neighboring galloping test spans were built as part of a program to improve high-voltage transmission systems. Electric utilities are looking increasingly at the development of more efficient insulators and better tower designs as a means of reducing the width of rights-of-way, highly desirable in view of the cost of land and aesthetic considerations.

At present, a 300-foot-wide right-of-way is required to accommodate eight 230-kv transmission circuits. Some of the 500-kv lines now under construction will require even wider swaths of land.

Before rights-of-way can be reduced, though, the triple problem of galloping conductors, insulator flashovers and switching surge difficulties must be solved. Results, using dampers to prevent conductor galloping and improved insulators, so far are encouraging.

"It's conceivable that we will eventually be able to reduce dimensions of tower cross-arms by 50 per cent," says Mr. Nigol, whose preliminary research in 1968 led to the current galloping studies

The dampers are being thoroughly evaluated both under simulated ice conditions and during real storms. To simulate ice, the research group made plastic moulds to create an ice-like effect on the lines and were thus able to continue their research year-round

So convinced is manager Jack Cassan that the galloping problem can be solved, the group plans to install 500 dampers at troublesome locations this year. "They'll cost up to \$100 apiece, installed, but it'll be money well spent," says Mr. Cassan.

He predicts that new insulators and dampers will enable high-voltage lines to



Oscilloscope at the right of the control panel is used to record data during surge tests on insulator strings. At right, Eugene Stasiuk checks testing equipment on a prototype damping device. Black strips on line simulate icing conditions. Research at Kleinburg may lead to reductions in the width of typical high-voltage rights-of-way, below.

be built with dimensions similar to those of existing lines of lower voltages. Plans are already in the works to uprate some 115-kv lines to 230-kv to prove the point. In addition, 500-kv lines little bigger than present 230-kv systems are likely.

"On today's lines, because of galloping conductors, air clearances are twice what they should be. Because of poor insulation performance, especially in the presence of contamination, insulator strings are much longer than we would like. By making these improvements, we'll be able to cut tower-head dimensions 50 per cent," Mr. Cassan says.

He expects to have the trial lines operating by mid-1973. Conversion of other systems and the construction of new 230-kv lines with drastically reduced dimensions will follow.

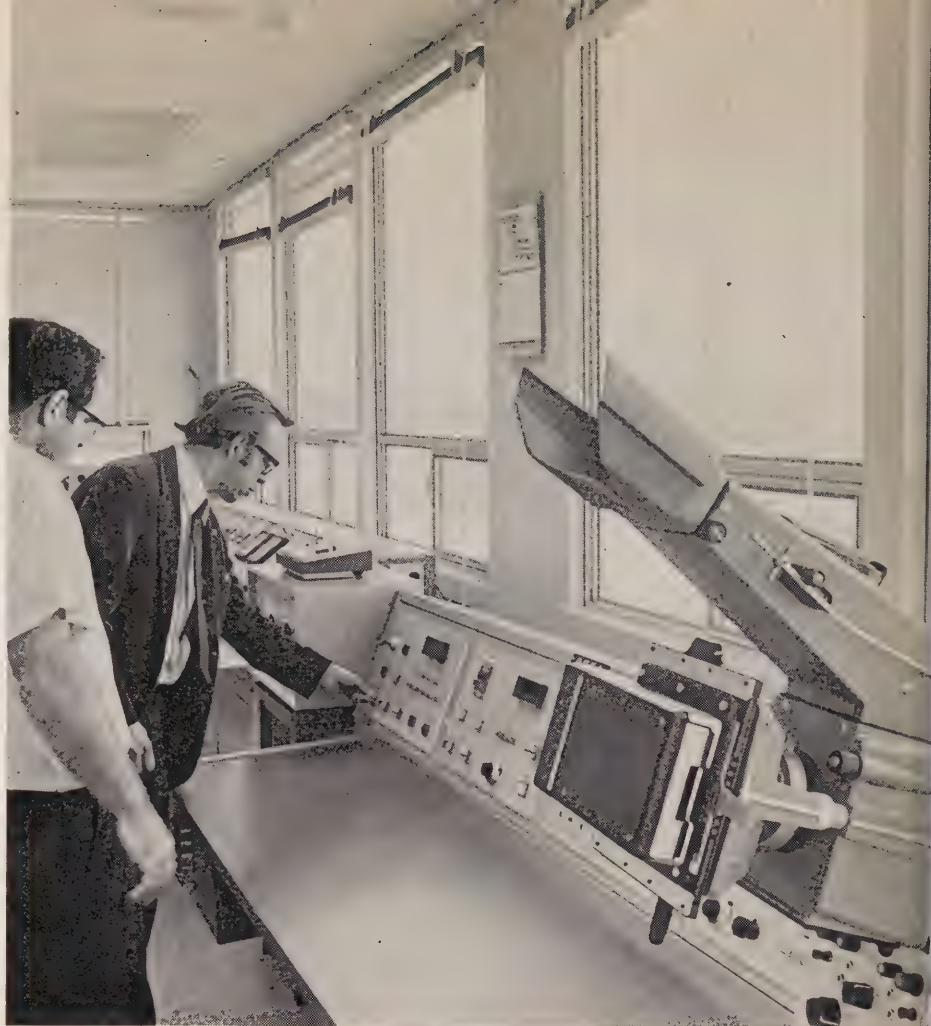
Reduced tower size, he suggests, could cut the cost of heavy-duty improved-appearance transmission lines by 20 per cent or more. Even greater savings can result from updating existing line voltages and avoiding new construction. At this rate, an estimated \$2.5 million spent on research over a five-year period will be recovered in short order.

Although one of the initial concerns as the program got underway was the cost of land, particularly in urban areas, there has been a growing interest in aesthetics and the group is evaluating imaginative proposals for tower design from two consulting firms.

"One proposal involves a six-circuit, 230-kv line on concrete towers only 45 feet high and requiring only 80 feet of right-of-way. This might be increased to eight circuits with 100 feet of land," Mr. Cassan adds.

The surge generator is being used to test tower heads and cross-arms of reduced dimensions under various conditions. It can be operated either manually or in fully automatic mode. In automatic operation, a complete series of tests can be programmed with respect to the number of voltage levels, the number of surges to be applied at each voltage, the magnitude of voltage steps, and the wave polarity.

The laboratory includes the most advanced form of measuring equipment. Digital voltmeters and a printer are used to indicate and record both changes in voltage and voltage peaks. To obtain more detailed information on flashovers, both surge and





memory types of oscilloscope with camera attachment are employed. Videotape permits lightning strikes and flashovers to be viewed frame by frame on instant replay.

Essential data such as temperature, humidity, barometric pressure, wind speed and direction are also measured and recorded. Severe weather conditions are difficult to simulate so the onslaught of an ice storm is welcomed. However, the effects of rain and fog and even ice can be induced artificially.

In recent years, deposits of airborne contaminants on insulators have become a serious problem. Laboratory testing has determined that semi-conductive glazes on porcelain insulators may significantly reduce electrical leakage by heating the insulator surfaces sufficiently to prevent condensation on them.

Several hundred insulators were made to research division specifications and are being tested in contaminant-prone locations. The surge generator is being employed to test the insulators at various voltage levels.

A review of system operating records at the beginning of the research program showed power interruptions due to insulator contamination were limited to wet weather, particularly fog. Interruptions were more frequent in rising rather than falling temperatures.

To simulate fog, rain and temperature fluctuations, an environmental chamber was built at Ontario Hydro's research laboratories in Metro Toronto. Experiments there showed condensation was the chief cause of contamination flashovers at normal operating voltages.

Condensation usually occurs when the humidity is high and the insulator surfaces cool relative to the surrounding air. Semi-conductive glazes to warm the insulator surfaces and a change in insulator shape to help eliminate the effects of rain were recommended.

"We have determined experimentally that sizeable reductions in the length of insulator strings are possible using these glazes," says Mr. Cassan. The research group is now working with three insulator manufacturers to develop and apply the new insulators. Five hundred prototypes are in trial use on an operating line.

As the research program passes the half-way mark, the group is encouraged with the results.

"We believe we are on the threshold of two technological breakthroughs — the radical improvement of insulators and the virtual elimination of conductor galloping. This is something utilities have been trying to resolve for 50 years," says Mr. Cassan. □



THE ROLLS-ROYCE OF THEATRE ORGANS

by Paul Chisholm

There are those who treasure tiffany lamps, collect old pulp magazines, and others who "oohh" and "aahh" at steam locomotives and antique cars.

Fewer in number, but no less avid in their pursuits, are people with a thing about rescuing and restoring old theatre organs. Not just any theatre organ, mind you, but those magnificent electrical-mechanical wonders of the 1920's more correctly known as the Wurlitzer unit orchestra.

It needs real enthusiasm for a man who can barely play the instrument to invest his life savings in one, spend three years building his home to accommodate it, and another four years reassembling and installing the unit. Such a Wurlitzer buff, though, is Bernie Venus, a 45-year-old electrician who, when not talking or thinking about organs, organists, or old theatres, works on computers for IBM in Toronto. Mr. Venus is one of a handful of Canadians who own a restored Wurlitzer. It took a six-month hassle with Canadian customs after a direct appeal to the Prime Minister to get the machine into the country.

"The Wurlitzer," Mr. Venus proudly says, "is the Rolls-Royce of theatre organs. Sure, there were other theatre organs, but basically they were not too different from church organs. The Wurlitzer unit orchestra, on the other hand, is just as the name implies — an organ with all the versatility and components of a complete orchestra."

Invented by an Englishman, Robert Hope-Jones, around the turn of the century, the unit orchestra became popularly known as the Wurlitzer after the name of its manufacturer — the Wurlitzer Co. of Tonawanda, N.Y. Today, the name is more synonymous with the company's electronic organs.

To purists like Mr. Venus, there is no comparison between the tonal qualities and versatility of a Wurlitzer and an electronic organ, although the latter has the advantage of compactness.

It takes a theatre-size area to hear a Wurlitzer at its best. The organ's massive pipes were usually built into the walls above and round the stage. By contrast, the electronic organ — which simulates and amplifies sound waves electronically by means of a "tone wheel" for each octave — takes up a total area smaller than the console of a Wurlitzer, and fits tidily in most living rooms.

The pipes of a Wurlitzer simulate all principal instruments of an orchestra, including woodwind, brass and strings. The heart of the unit is a blower which pumps air through the system at constant pressure. Electric impulses trip an intricate valve system which makes music by releasing air through the pipes as keys are depressed by the organist. Similarly, released air activates the mechanical instruments, which in a typical unit included drums, xylophone, gongs, bird whistles, door bells, sirens, horses hoots and pounding surf.

The end result is great versatility of sound, and organ accompaniment was very much a part of the entertainment in the days before movies were making complete sound and sound effects more

written for the Wurlitzer. There was also the sing-a-long. Two generations before the shaggy debut of an entertainer named Tiny Tim, theatre patrons would vocally Tip-Toe Through the Tulips to the accompaniments of the theatre organ, while on the screen a bouncing ball would indicate words and tempo.

Mr. Venus' love of organs dates back to his childhood in Montreal where he would listen to a pipe organ in a department store. He and his brother, Alfred, built up an impressive collection of 78-rpm recordings by such top English organists as Quentin MacLean, Sidney Torch, Reginald Dixon and Reginald Foort — personalities young Venus came to know first-hand in later years.

While his school friends concentrated on hockey stars, Bernie Venus wrote to organists for their photographs and he read all he could about the mighty Wurlitzer. World War II saw Mr. Venus posted to England with the Canadian Army for four-and-a-half years. On leave he took every opportunity to investigate theatres and organs.

"Theatre organs were particularly popular in England, and there were still plenty of them around in those days," he recalls. "You just never knew where you would come across one."

He soon established a warm kinship with other organists who came to recognize the eager young infantryman sitting close by

...up shows array of keys of mighty Wurlitzer
...n installed in Toronto home. Below, electrician
...ie Venus is surrounded by organ pipes.



... and Elaine Venus pose proudly with
theatre organ installed complete with equipment in
special addition to home. Right, organist Douglas
Young is at the console.

performance after performance. Some
made arrangements for him to be admitted
to the theatre free; others told him of
organs in other communities and gave him
letters of introduction to organists.

Back in Canada, Mr. Venus learned to his
 dismay that there were precious few
Wurlitzers here. Just 11 in the entire
country, he was to discover, as against 16
in the bordering U.S. city of Buffalo
alone.

The reason for their scarcity in Canada,
he believes, was the high level of duty and
sales tax that applied during the years of
their peak popularity — costs which could
add 25 per cent on the installed cost of a
Wurlitzer. This was big money in the
1920's and sufficient to persuade theatre
operators in Canada to settle for a less
costly, if less versatile, organ.

In Toronto, where Mr. Venus settled after
the war, a Wurlitzer was still in use at Shea's
hippodrome. But to extend his hobby, he
visited theatres in neighboring U.S. states
where they were still in use.

To track down organs sold in Canada, he
wrote to the manufacturers in Tonawanda
copies of original sales slips. His in-
vestigations frequently came to a dead-end,
however, because all traces of an organ
were frequently lost when it was sold on
the demolition of a theatre.

One, he learned, was still in use in a theatre
in Vancouver, another was in a monastery
in Quebec. A third, when last heard of,
was stored in a barn near Picton. While
tracking down Wurlitzers, Mr. Venus
learned of others who shared his love for
them. A Montreal doctor had bought one
in Chicago and installed it in his home.
Another was in the home of Hal Logan,
a corporation lawyer for the city of Niagara
Falls, Ontario.

Hal Logan who alerted Venus in 1959
that the Wurlitzer in the Granada Theatre,
Buffalo, was up for sale. Mr. Venus promptly
went out for Buffalo and his offer for the
Wurlitzer was accepted after a week's
deliberation. He and three other organ
lovers spent the next three weekends amid
grime and dust dismantling the organ
and packing it for shipment to Toronto.
The Wurlitzer was originally valued at



between \$25,000 and \$30,000. Including
the cost of getting it home, Mr. Venus paid
\$2,200.

But it was not quite so simple. After the
purchase, he learned that Canada had just
passed an anti-dumping law relating to a
wide range of imports — pipe organs in-
cluded. It appeared that he may have to pay
a special duty of 75 per cent on the original
value of the organ less depreciation, plus
sales tax of 25 per cent.

"Despite countless trips to the customs
during the next six months to provide such
documentation as original cost from the
factory, shipping and installation charges
and the present value, it was to no avail,"
he recalls. "No one seemed authorized to
make a decision and in sheer frustration
I wrote to Mr. Diefenbaker. My letter was
passed on to the Minister of National
Revenue and I was asked for proof of the
date of purchase. Then I promptly got
the go-ahead."

Getting the Wurlitzer physically across
the border also had its problems. The load
was higher than the 36-foot tractor-trailer
rented for the haul. It meant the vehicle
could not go under highway bridges and
that alternative routes had to be scouted
out.

Soon Mr. Venus' garage and basement
bulged with organ parts. Then began the
task of washing and cleaning 30 years of
dirt accumulated since the organ was
installed in the theatre in 1927. That task
alone took almost a year.

To house the organ permanently, Mr. Venus
had to build a 15 by 39-foot extension to
the house at a cost of \$8,000. That kept him
busy for the next three years. There were
electrical considerations, too, and

enlisted the advice of Richmond Hill Hydro
from the start.

"One of the engineers took a keen interest
in the whole thing," he recalls. "He came
right over and advised me of the practical
layout for my needs, and the most eco-
nomical method of installation. He also
sold me on the idea of installing two de-
humidifiers to protect the organ."

Mr. Venus converted the three-phase
motor which powers the blower to operate
on a single-phase and rewired it from
25-cycle to 60-cycle. It is housed in a
concrete chamber behind a four-inch
soundproof door. With the heavily-insulated
addition to the house completed, it took
Mr. Venus an extra four years to rebuild
and install the organ.

"About half the job could be termed
electrical," he says, "but it also entailed
re-leathering the cushioning for the organ's
components and reinstalling more than
1,000 pipes."

Wurlitzers, for the record, contain about
20,000 electrical contacts and 35,000 feet
of wiring. Mr. Venus and his friends cut
some 3,400 connections when removing
the organ from Buffalo, and each had to be
resoldered in place.

The first recital in the Venus home was in
June, 1968 — just eight-and-a-half years
after he bought the organ. Since then, he
has installed additional pipes and instru-
ments to the unit. All the original Wurlitzer
sound has been retained, and a system of
shutters gives complete control of volume.
A far cry from the atmosphere of a theatre,
though, the décor of the music room is
Chinese, with gold and black velvet drapes.
The three-manual console is raised slightly
from the floor.

Mr. Venus' obsession with theatre organs
is not matched by any great ability at the
console. He is able to render chords to
illustrate its capabilities and play a few
modest numbers. But his joy is listening to
and appreciating the Wurlitzer at the hands
of an accomplished organist.

He was also one of a group of ardent organ
lovers in Toronto who recently completed
the four-year task of restoring the Wurlitzer
from the now-demolished Shea's Hippo-
drome and installing it in Casa Loma,
where it has found a permanent home after
a brief sojourn in Maple Leaf Gardens.
That again leaves Bernie Venus idle. So
if you happen to come across an old
Wurlitzer that no one is using, he's certainly
your man. . . .

"Every home should have one," he insists.

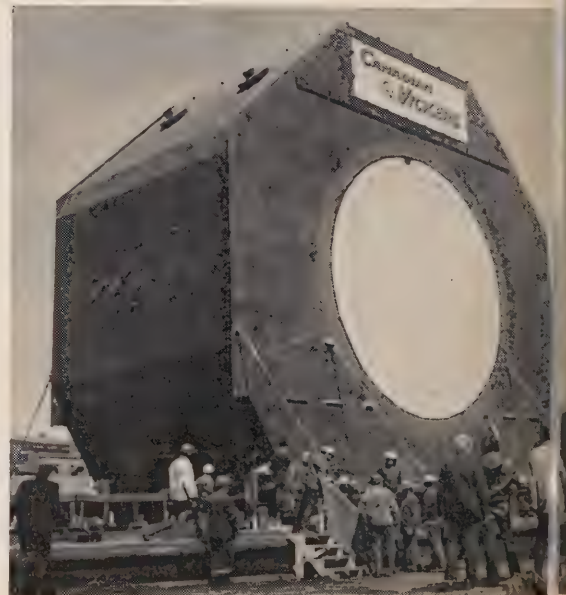


cider send-off for atom-splitter

Inch by inch, the 700-ton reactor assembly was winched along rails in a Montreal shipyard toward a sunken barge.

The rail system and barge were designed to transport the first of four such assemblies from the Canadian Vickers Ltd. plant in

Quebec's Minister of Trade and Commerce, Guy St. Pierre, uses a bottle of the province's finest cider to launch the Bruce reactor assembly in Montreal. Other photos show workmen checking supports before the barge sets sail and the reactor assembly passing through the Welland Canal on its 800-mile journey.





Home and (almost) dry, reactor assembly is floated up to dock at Bruce generating station

Montreal to Ontario Hydro's Bruce generating station at Douglas Point on Lake Huron. The special barge was submerged to give a firm footing for loading and unloading the heavy equipment.

It took 10 days for the assembly, looking much like a giant octagonal nut, to cover the 800-mile Seaway route. Another is due to be launched from the Vickers plant this fall, a third in 1973 and a fourth in 1974.

Two tugs hauled the heavy barge. Measuring about 44 feet high, 49 feet wide and 26 feet deep, the assembly was mounted on bogies so it could be winched to and from the barge. Additional shielding and a shield tank extension were also fastened securely on the vessel bringing its payload to more than 1,000 tons.

The assembly, culmination of two years' work by Canadian Vickers Ltd. and Dominion Bridge Co. Ltd., consists of calandria, shielding and two end shields. The calandria is a cylinder about 28 feet in diameter, 16½ feet long, and is made from 1¼-inch thick stainless steel. The heart of the reactor, it contains more than 120 accurately machined nozzles for control mechanisms, pipe connections and instrumentation.

The calandria shell was built by Dominion Bridge and shipped across Montreal by truck to the Vickers plant where the shield tank and end shields were built and the structure assembled. The cross-town trip took all night.

Assembly tolerances were extremely fine. New alignment techniques using both optical and electronic instruments were developed to meet the specified tolerance of 1,000th of an inch per 20 feet. When fitting the calandria into the shield tank assembly, workmen had only ⅓ of an inch clearance at any point.

When the reactor vessel was ready to set sail for its permanent home, it was given a traditional send-off. But instead of cracking a magnum of champagne over her hull, Quebec's Trade and Commerce Minister Guy St. Pierre used a bottle of the province's finest cider. □







Water dances to computer's tune

by Bob Morrow

It's a far cry from the waterwheel and the old mill stream. In this age of instant power, a computer in Toronto senses the need for more electricity and sends a microwave signal at the speed of light to the governor valves of a Niagara River generating unit.

Control gates open automatically, more water pours into the turbines and, within 10 to 15 seconds, more electricity is surging into Ontario Hydro's network to meet an increase in demands.

Together with the microwave system, an initial on-line computer and TV-type readout screens have been installed at Hydro's system control centre in Etobicoke to improve system security and to monitor vital interconnections with neighboring power systems.

Such devices may sound like props for a moon landing, but planning is well underway for an even more exotic array of hardware to help system operators control an expanding power network of increasing complexity.

It will include two computers, 22 color TV monitoring screens and a wall display showing the open-close position of key circuit breakers on high-voltage lines.

A circuit breaker is a sophisticated type of fuse which protects expensive equipment from damage. It will open, for example, when lightning strikes a transmission line and close automatically after the power surge.)

Expected to cost over \$25 million plus about \$1 million a year for equipment rentals, the new setup will include a comprehensive data acquisition network and associated computers for the control centre. The installation, which will start



Heart of protective microwave system is special control room at Hydro's system control centre. Twenty additional microwave stations are planned in next five years.

operation by 1975, will be known as DACS (Data Acquisition and Computer System).

Aside from network growth, why is such equipment needed?

A power system is a dynamic entity that needs constant scrutiny and attention at a number of points if it's to respond instantly to continual fluctuations in demands and major contingencies. What's more, sudden emergencies require quick operating action to prevent widespread interruptions.

At present, the control centre has an IBM 1800 computer fed by a flow of data from an existing telemetering network. In addition, the computer's memory bank contains 32,000 words, including system control

orders that used to be contained in a number of thick manuals. The memory core is augmented by 1½ million words on magnetic discs which can be plugged in as needed.

Now, important pieces of this information can be summoned by keyboard and instantly displayed on one of the three cathode ray tubes in the system control room.

The computer thus helps system operators to assess complex situations quickly and to determine appropriate action based on data which is constantly being updated by system performance engineers. To analyze causes of trouble, the memory bank can be tapped automatically for printouts of important data.

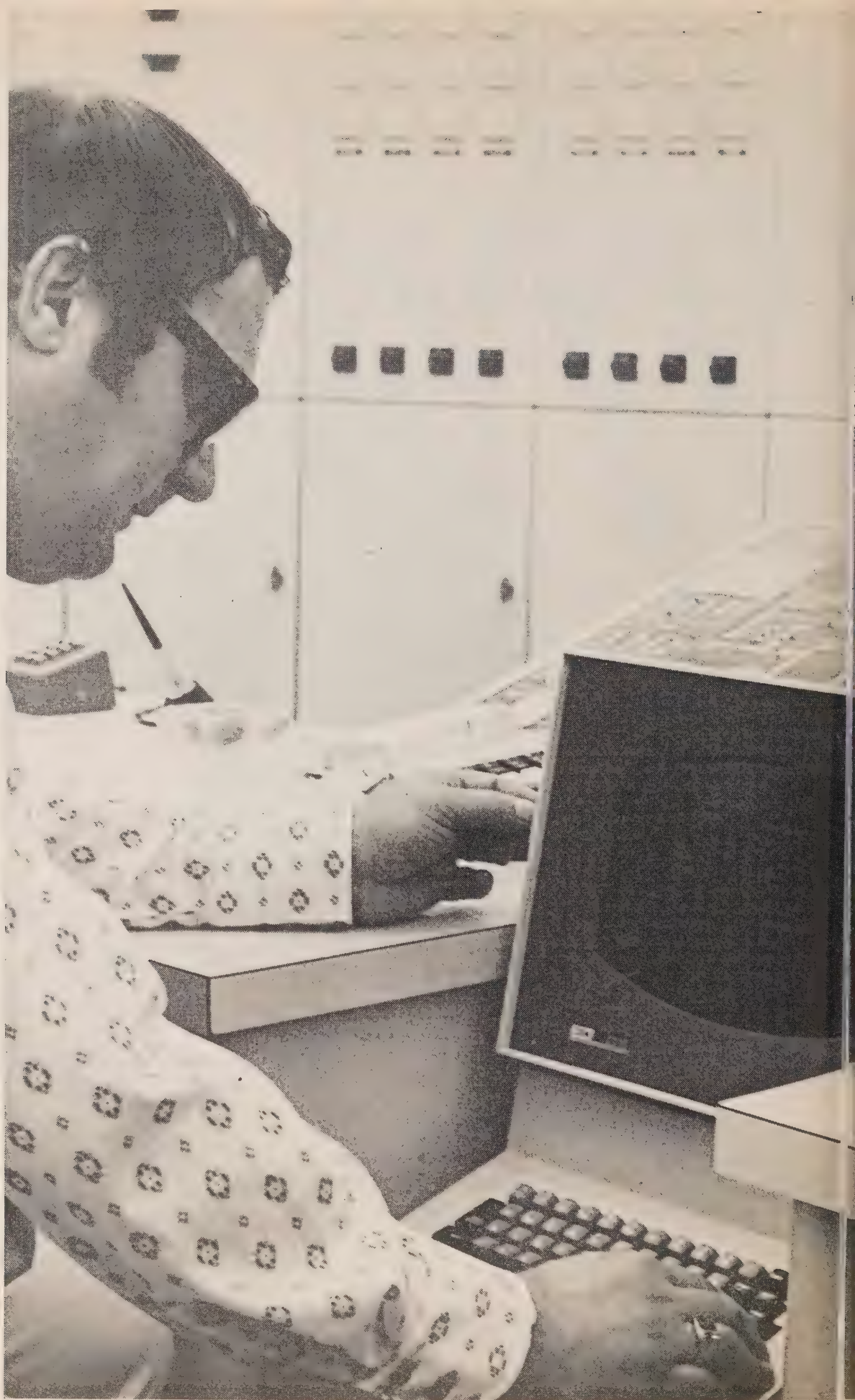
Most importantly, the computer keeps a constant watch on the interconnections with neighboring utility systems. If a flow of 200,000 kilowatts is scheduled for transfer between Ontario and New York State, the computer monitors that flow. If there's any deviation, the computer signals for an increase or decrease in power from a regulating plant.

In this way, system frequency is maintained at an even 60 Hertz (cycles per second). This control measure ensures Ontario's generators work in harmony with interconnected utility systems to ensure network stability. It also maintains the accuracy of all electric clocks in the province.

The computer also monitors the loading on certain critical transmission links and will soon take over a complex bookkeeping operation related to Niagara River control which now keeps a man busy around the clock, seven days a week.

The DACS will do all this and more. It will ultimately power Ontario Hydro's 150

Keyboard is used to
summon data required for
system security from
computer on TV-type
readout screen. At right,
programmer checks data
in computer room.





major generating, transformer and switching stations.

DACS will provide a picture of the power system conditions every two seconds. Each of the stations will be equipped with a remote terminal. A Richview computer will poll each of these terminals every two seconds and instruct them to send in the latest data, thereby constantly updating the data base.

Another role for DACS is called predictive security analysis, which will help to anticipate and prevent problems instead of solving or correcting them as they arise.

If you are going to take out certain lines or pieces of equipment for maintenance two hours from now, the only way to do it safely is to predict how you'll be running at that time," says Don Nevison, operations planning and development engineer.

The operator will use a keyboard, light pen or other means to feed data into the computer on how he expects the system will look in two hours' time. Then the computer will analyze the current situation, search its memory and come up with a check list for system security.

By the end of next year, 48 key high-voltage stations will be incorporated into the system. By the end of 1974, 108 key

stations will be on-line to the computers, including all 500-kv, all major 230-kv and some 115-kv stations.

Up-to-date information on the status of the 48 key stations will be represented on a wall diagram at the centre. Four color TV-type units at each of the three system control positions will display station information in greater detail.

"This particular function is most important to the system supervisors for reliable operation and will be a blessing to them for analysis of system disturbances and speedy recovery of system load," says Jim Harris, system supervising engineer. "It is a facility which we have wanted for many years and can now justify based on our system size and complexity."

A new wing will be added to the control centre to house the DACS hardware.

The two computers will normally share the computing load of DACS. If one computer fails, the remaining computer will be capable of processing all of the critical information.

At the same time the existing microwave system, manned from a special control room at the centre, will be expanded. Installed primarily as an integral part of a line protection scheme, the microwave system passes information at the speed of light between sensitive relays. A power

fault on a transmission line will cause relays at one end of the line to open circuit breakers. But to isolate the line, relays at the other end must simultaneously open circuit breakers there.

The microwave system will perform this task as well as carrying channels for voice communication and monitoring data from generating and transformer stations. In so doing, it replaces in part the previous communications system, consisting of leased telephone circuits and power-line carriers, which operated over the transmission lines themselves.

The microwave network now includes 56 microwave stations covering a large part of Southern and Northern Ontario. An additional 20 stations are planned in the next five years to accommodate new generating stations in Southern and Eastern Ontario.

The expanded microwave system will provide the protection, control and data-gathering systems for a growing power network in Canada's most highly-industrialized province. Together, microwave and DACS will mean improved service and a reduction in the likelihood of serious power interruptions. [



TO RENT OR NOT TO RENT

by Susan Goldenberg

That is the question. But only their rental agent knows for sure.

These days it is possible to live without owning practically anything. You can live in a rented apartment or house furnished with rented furniture and paintings. You can drive a rented car to a company that rents its office space and uses rented equipment or machinery. If you're throwing a party, you can rent everything from dishes and furniture to a costume and magician. Taking a vacation? Then how about renting a trailer, boat or even an airplane?

Even taking out a loan to purchase an article is really renting money. Today, it's almost as easy as tying a shoelace. Banks no longer frown on people who want to borrow, but instead entice them to do so. If the bank says "no," you can always go to a credit company.

Leasing is becoming popular in business operations where companies with available cash buy industrial equipment and rent it to other firms, getting back both the item and interest on its cost through rental payments.

The world's largest leasing company is Greyhound Leasing and Financial Corporation, a 10-year-old subsidiary of the bu

Reflections of a bygone era are captured here as Cathy Searl models a garden party costume from the 1890's at Malabar's

Photo: Ron Brown

people. It has 100 customers and 500 leases in Canada and will only get involved in business averaging \$500,000 or more on such items as jet aircraft and railway and construction equipment. Greyhound even leases the outside elevators for the Skylon observation tower in Niagara Falls. The firm is also the foremost computer leasing company in Canada.

Although a firm may have its name on the building, chances are today that it is a tenant rather than owner.

"Ninety per cent of the office space and the bulk of industrial space is leased today because of the many advantages," says Bill Moore of A. E. LePage's commercial leasing department. "Owning property means a firm can't invest as much of its working capital in building up its business as it can with leasing," he explains. Also, when space requirements change, a company in rented premises can relocate much easier.

The office furniture rental business is booming because it, too, permits firms to invest money in other equipment or goods. In addition, rental costs can be used as a tax write-off.

With people more on the move today, the apartment furniture rental business is mushrooming. "Our business has increased by 300 per cent over last year," one Toronto agent says. The average cost of furnishing a one-bedroom apartment in contemporary, Danish, French Provincial or Spanish style is \$25 a month.

Apartment furniture rental is especially popular with companies footing the bill of transferring their executives for a short time. The cost can be chalked up as a tax-deductible expense. Sometimes, however, a transferred executive may rent an already furnished apartment including linens, broadband, television, dishes and maid service.

You can even rent expensive oil paintings from organizations like the art rental service of the Art Gallery of Ontario. With more than 600 contemporary paintings, drawings, graphics or sculptures, the service is the most extensive on the continent. It's available only to Art Gallery members and the monthly rental ranges from \$3 for a \$100 picture to \$30 for a \$3,000 one.

"We want to provide an educational service to the community and encouragement for the artist," explains Mrs. Dora Stewart, head of the service.

For parties, you can rent games, marquees, music groups or the services of a clown or magician. Party supplies such as chairs,

tables, cocktail bars, coat racks, dance floors, dishes, silverware and linen can also be rented.

The largest party goods and supplies rental firm in North America is Chair-Man Mills, of Toronto. This 60-year-old firm has 1,000 different types of items, including nine varieties of chair, 25 table sizes, 10,000 china settings, 10 different silver tray sizes and three different silverware patterns. Chair-Man Mills also rents out more unusual items like portable bleachers for sales meetings and product demonstrations, fashion show runways and blackboards and easels for offices and universities.

If you're throwing or attending a formal party, you can also rent your outfit. Canada's oldest formal rental firm is Syd Silver's in Toronto, which is represented by 500 other stores across the country.

Silver's has 10,000 garments in 30 different styles and averages about 25,000 rentals annually. A change in style, however, is a serious matter. "Because our business aims at fitting all sizes and shapes, we must make 400 to 500 suits each time we introduce a new line," Mr. Silver explains.

For costume parties there is Malabar's, in existence half a century. It was founded in 1902 in Winnipeg by Sarah Malabar after her husband died and a fortune teller told her she could see her working in an odd business with a lot of clothes. A colorful woman, who wore grey wigs because she felt her red hair was undignified for her age, Mrs. Malabar later expanded her business to Toronto and Montreal. Today, each of her three children runs one branch.

The Toronto store specializes in grand opera productions in addition to its individual rentals. Its staff of 45 is able to create spectacular costumes overnight in response to frequent rush requests. The 60,000 costumes are categorized according to opera or period with the women's on one floor and the men's on another. A wig shop is on the ground floor.

After a fire in 1956 which destroyed 98 per cent of their stock, the firm established a master catalogue system with drawings of each costume.

Although Malabar's opera business is steadily growing, its individual rentals are decreasing because, as vice-president Geoffrey Curtis explains, "people are wearing costumes — like Edwardian suits, for example — to work today." Mr. Curtis also says the renting of costumes follows a kind of tradition. Most men opt for Don Juan outfits and women, no matter what their shape, prefer bunny costumes.

A pastiche of extravagant, jet-set delights is also available for those bound for faraway

places. It's possible to rent a small plane from a sky charter service with a minimum weekly rate of \$232. If you don't like flying, you can rent a four-sleeper boat cruiser for \$300 a week in-season and off-season, or an eight-sleeper house for \$375 a week.

Although the bulk of the rental trade caters to the obvious needs of today's mob and fun-loving society, you can also intellectual enjoyment for no rental cost — just the concealed tax. This food for thought is obtainable throughout the province and more and more people are partaking of it. In 1969, for example, 50 million items, including books, films and reference material, were borrowed from Ontario libraries. □

It's big business at Hydro, too

In one form or another, Ontario Hydro has extensive commitments in the leasing of equipment either through the supply division or the rental departments.

The Commission's supply division acts as an internal rental agency and provides vehicles and equipment for the organization. However, quite often supply divisions must first go out and rent the particular piece of equipment required.

Since the first of this year, the supply division has been encouraging rentals on a broader basis than previously. Bob Feaver, fleet administrator, says 350 units rarely used have been set aside specifically for short-term rental. This includes 50 automobiles and Mr. Feaver says the rates are lower than could be obtained outside.

"When we sent four cars to the head office garage to be available to customers, we found we could not keep up with the demand. At one time we had 17 requests for vehicles at that location."

One of the biggest customers is the property division, which has taken 17 cars on a two-year term.

Mr. Feaver said the rental program will help measure the Hydro fleet requirements for the future and determine whether short-term use spread over several divisions might reduce the over-all outlay. He noted that in 1971 a transport fleet of more than 4,000 vehicles of various types travelled 34 million miles for Hydro.

George Severin, manager, transport and work equipment, says general policy is

Cars and trucks, heavy duty work equipment and snowmobiles are among the array of equipment available for rental to the various divisions of Ontario Hydro



determined by economics. If long-term use of equipment is expected it will probably be purchased and charged out to the project concerned. Short-term requirements are usually in the form of rentals

Hydro spends about \$2 million a year renting vehicles and equipment that fall into the latter category. Some cranes, pumps and other equipment used on various construction projects are rented. However the huge cranes used on the reactor buildings at Pickering nuclear power station were purchased because of the length of time they were to be used at the station. They have been modified and are being used again at the Bruce nuclear project on Lake Huron.

Mr. Severin states that his department supplies more than 4,200 vehicles and 2,200 pieces of equipment to various divisions of the organization. Including such items as depreciation, interest and repair costs, estimated savings of 10 to 20 per cent per unit are still achieved

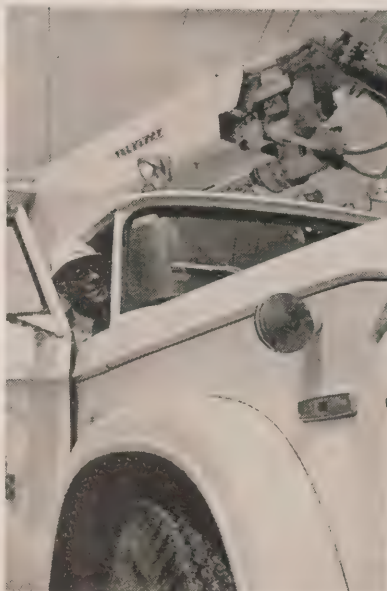
"Unless we can provide an item at a lower cost than an outside agency, we don't get the business," Mr. Severin says

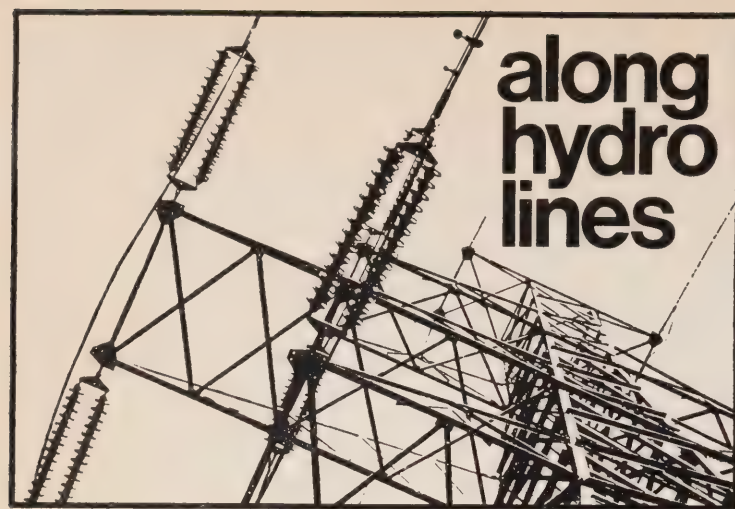
On rare occasions, Hydro will rent the services of private aircraft companies for survey and similar work.

In addition to renting some of its equipment, Hydro also rents office space. The most significant example of this was the decision to rent a new building at 77 Bloor West to meet a critical shortage of office space

J. L. Witbeck, manager of building and office facilities, says the Bloor Street lease was not signed because it was cheaper to rent than to build, but because of an immediate need for space. He suggested that leasing for Hydro is not as advantageous as in private industry because Hydro does not pay income taxes and cannot write off leasing costs against taxable income

Hydro also leases its Cascade water heaters to customers. Approximately 150,000 of the 400,000 water heaters in rural areas are rented and the municipal utilities lease another 300,000 to their customers





along hydro lines

Growth slows

Ontario Hydro supplied a record 68.1 billion kilowatt-hours of primary energy last year, says Hydro's recently released 1971 annual report.

The figure represents a 6 per cent increase in primary energy supplies, down from an 8.2 per cent increase the previous year. This slackening, says Hydro Chairman George Gathercole, reflected the more moderate pace of the economy and weakening of markets for some large industrial customers.

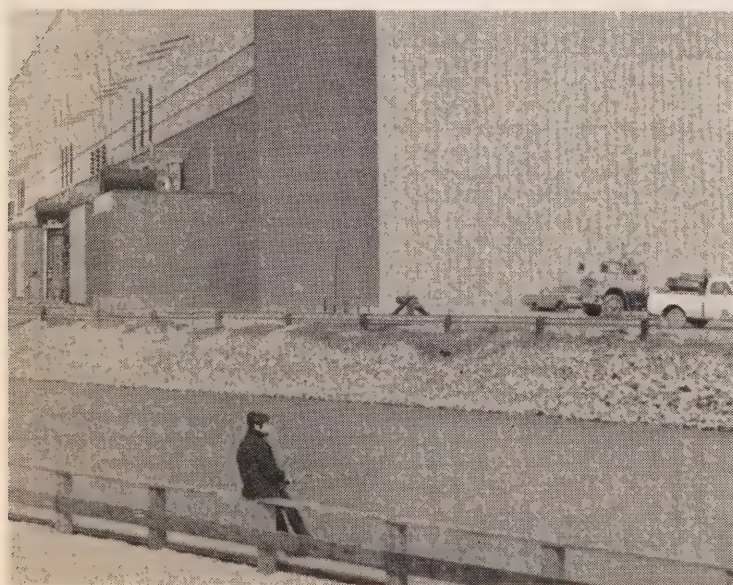
The report shows that during 1971, generating capacity of 1.3 million kilowatts, mostly nuclear, was added, raising total system capacity to 13.9 million kilowatts. The number of customers rose to 2,438,000, up about 50,000 over 1970.

Average annual consumption per residential customer continued its rise with a 1971 figure of 8,350 kilowatt-hours, compared to 1970's figure of 8,002. A decade ago, Ontario consumers were using an average of 5,820 kilowatt-hours. □

Fishing in comfort

The outflow channel at Ontario Hydro's Lakeview generating station has long been a favorite fishing spot for Metro anglers, but it's becoming even more so these days.

There are two reasons for the increased popularity. A 40-foot bench helps the fisherman pursue his hobby in comfort, and coho salmon are starting to gather in the area.



Coho are coming

A new dock constructed along the channel last year is accessible to the public as it's adjacent to a park. While the channel itself is quite shallow, fishermen can easily cast their comfortable perch into deeper water.

Catfish and carp are common catches at Lakeview, as well as smelt when they're running. However, a team of University of Toronto students studying coho salmon on the Credit River have noticed a rather startling increase in their numbers in warmer waters around Lakeview.

What's more, they found a significant reduction in large scars on the fish.

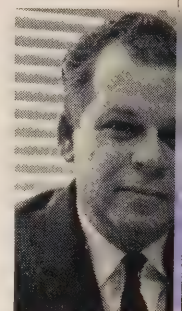
Regional managers



T. E. Flinn



A. M. Pedersen



L. A. Coles

Ontario Hydro's Northeastern regional Manager, T. Edward Flinn, has been transferred to Belleville where he will assume a new capacity in Eastern region, succeeding Alex M. Pedersen, who is retiring after 41 years' service with Hydro.

Mr. Flinn will be succeeded in North Bay by L. A. (Vern) Coles, Central region operations manager.

Mr. Pedersen has been Eastern region manager since 1968. Born in Copenhagen, he joined Hydro in 1929 as an electrical engineer in the Niagara district and while employed there received a B.A.Sc. in electrical engineering from Queen's University in 1933. Mr. Pedersen was appointed Niagara district electrical maintenance superintendent and moved to Eastern region in 1938 as operations engineer, a position he held until his appointment as manager.

Mr. Flinn was appointed manager in Northeastern region in 1968, after having served four years as operations manager. Since joining Ontario Hydro in 1939 following graduation from the University of Toronto in electrical engineering, Mr. Flinn served as a junior engineer in the electrical engineering department; assistant to the district superintendent in the operations department, Smiths Falls; line maintenance superintendent, operating superintendent, and operations engineer in the former Central (now Eastern) region, before moving to North Bay.

Mr. Coles joined Hydro in 1947 following graduation in electrical engineering at U. of T. In 1948 he was appointed to Central (then Toronto) region's meter and relay section.

He joined the Personnel branch at head office in 1951 as a junior engineer training officer and served in that capacity and as technical trades training officer until 1956 when he was promoted to operating superintendent in Belleville.

Mr. Coles returned to Central region in 1963 as operating superintendent and in 1965 was appointed the region's operations manager.

Powerful board

The New York State Senate has approved the setting up of a five-man power plant siting board with authority to override local zoning laws and decide where generating stations should be located.

The need for such a board has been cited repeatedly as

to break the logjam of power plant controversies that has been growing in the U.S. as a result of mounting public concern for the environment.

The bill provides that the board's hearings will be held in the area under consideration. A payment of \$25,000 for each plant application will be made to help localities hire expert witnesses and consultants to bolster their arguments.

Nuclear versus oil

Federal Energy, Mines and Resources Minister Donald Macdonald is considering national policies to encourage the diversification of energy supply into nuclear from more traditional sources, and particularly from foreign-based oil.

In his presentation to the government's standing committee on national resources and public works, he said that under present world circumstances the supply of foreign-based oil "cannot be described as wholly secure."

Praising the work of Canada's nuclear scientists and engineers, Mr. Macdonald said: "With the ability of Pickering to outperform any other nuclear electrical generating system in reliability of power produced in continuing operation, in considerably lower operating costs, we are hopeful that the utilization of the Canadian CANDU system will attract increasing international attention.

"There is no doubt that industrial countries diversifying their energy problems to nuclear sources will take a substantial interest in the performance of the Pickering plant, and if it continues to perform at current levels over a longer period of time, then I believe we will have established something spectacular in demonstrating the scientific and technical competence of Canadians," Mr. Macdonald said.

Operation trashcan

The Department of the Environment has launched an intensive 150,000 advertising campaign to introduce the trashcan, "a remarkable pollution control device."

Environment Minister James Auld says before the anti-litter drive is over he hopes to hear "a real public outcry for more trash receptacles in the parks, on the streets and along the beaches. Everyone will be made to stop and think before they discard so much as a gum wrapper," Mr. Auld says.

Mr. Auld told the Legislature he hopes to make every citizen of Ontario conscious of trash this summer.

Advertising in newspapers, on radio and television, on posters and on billboards will be keyed to let people know about the trashcan. Municipalities will be asked to make trash receptacles available in public places.

A Task Force on Litter composed of representatives of government, municipalities, industry, and citizens' groups has been set up to plan a united attack on the litter problem. "This time we're pulling together to fire a real broadside," Mr. Auld said.

Bomb 'threat'

The army was called to Des Joachims generating station after word was received that a group of insurgents was trying to plant bombs under the tailrace transformer banks.

The imposters were caught and apprehended.

It was all part of the 3rd Battalion Royal Canadian Regiment's internal security exercise "Operation Power Volt," set up to give Stawawa-based soldiers practice in protecting a major public utility installation from imaginary saboteurs and terrorists.

Soldiers played the parts of unruly mobs and subversive groups as well as defenders.

The training encompassed many aspects of internal security operations such as escorts and protection of important individuals, patrolling and area searches for people, weapons, and equipment,



Watchful eye



'Who goes there?'

vehicle halting and searches, random vehicle and foot patrols and crowd dispersal.

Army spokesmen said the reason for holding the exercise at Des Joachims was to create realism. In the dam area, there was an opportunity to achieve a far greater degree of reality than would have been possible in a regular training area.

Assistant plant superintendent Paul Haack was given the VIP treatment for the duration of the exercise. Everywhere he went he had a military escort. Soldiers maintained an around-the-clock vigil at his home in the colony and even accompanied him if he went out for an evening at the recreation centre.

Cars and trucks entering the colony were searched and identity cards were checked. Army personnel were stationed at barricades on every road leading to the colony and plant. Searchlights were mounted on the dam and soldiers in full battle dress carrying walkie-talkies were everywhere.

And Des Joachims is still feeding power into the provincial grid.

Sugar port

Dredging operations are under way at Oshawa harbor to create a deep-water port.

The announcement that the "motor city" would join other ports along the St. Lawrence Seaway able to handle ocean-going ships was made to the city's Chamber of Commerce by Federal Transport Minister Don Jamieson. It followed a conference between Mr. Jamieson and George E. Creber, president of the George Weston Ltd. food empire.

The Weston firm will build a \$7.5 million sugar refinery on a 10-acre site on the east side of the harbor. The transport depart-

ment will assist in the harbor development which is being dredged from its 21- to 24-foot depth to 27 or 28 feet to facilitate ocean freighters.

The proposed refinery will handle sugar cane and process 75,000 tons of sugar in its first year of operation and twice that amount in subsequent years. It will employ a staff of 60.

Chamber of Commerce president Fred Ball said the new industry and development of a deep-water port would spark further industrial development in the area.

The new port will make Oshawa one of the major shipping terminals on the St. Lawrence-Great Lakes system. □

Need \$50 billion

Resources and energy development in Canada during the 1970's may require an investment well in excess of \$50 billion, says Donald S. Macdonald, federal minister of energy, mines and resources.

Mr. Macdonald, speaking to a Canadian Nuclear Association symposium in Toronto for editorial writers, said there is an "urgent new requirement" for the re-examination of national resource and energy policies.

Mr. Macdonald said completion of the review will be his "prime objective" in 1972.

The review will examine, among other things, "the fundamental question of what kind of society we seek to have," he said.

"Clearly, we know we are committed to a policy of economic growth, but exactly how fast and in what directions we cannot yet be sure."

He said growth must be orderly to avoid "economic distortions with an unwarranted cost to the economy expressed through inflation, a rising foreign exchange rate and reduced exports."

Editorial writers from across Canada visited Pickering nuclear power station and took part in the CNA symposium at the Ontario Science Centre. Hydro Chairman George Gathercole led the first half of the day-long session that explored the future of nuclear power, energy supplies and environmental protection.

Underlining the importance of energy in the future, Mr. Gathercole said Hydro's capacity may reach 100 million kilowatts from hydro-electric, fossil-fuel and nuclear sources by the year 2000.

Nuclear estimates

E. S. Bell, of the National Energy Board, forecast Canada's nuclear generating capacity will reach 87 million kilowatts by the year 2000, of which 50 million will be located in Ontario, but he pointed out variations could occur.

"Society has not yet decided what the trade-offs should be made between ensuring a reasonable standard of living for all and reducing pollution. There are no clear guidelines to balance the increased use of energy to improve our quality of life and the aesthetics of industrial activity."

However, Dr. John S. Foster, vice-president, Power projects, Atomic Energy of Canada Limited, predicted that by the year 2000 nuclear capacity may reach 120 million kilowatts. "This is my personal estimate," he said.

Dr. Foster predicted there will be no fast breeders in Canada by the turn of the century. Most of the plants will have heavy water reactors with or without enriched fuel but some may be light water reactors.

"This amount of generation will entail an expenditure of \$50 billion in today's money for the power plants alone, and about 10 per cent more in supporting facilities," he said.

Answering the question of whether we should slow the predicted growth, Dr. Foster said: "The rate of growth is in the hands of the public. There is hardly anything as democratic as electrical energy . . . I am predicting that the Canadian public will want the

better life, the better environment that ample electrical power can bring."

Earlier, Mr. Bell predicted Canada may face higher costs of energy but no shortage in supplies of fossil fuels or uranium by the year 2000. "Our problems are more in the nature of choices between different energy sources and planning energy policies in relation to our surplus resources," he said.

Farms thriving

The family farm is alive, well, and thriving indeed in the Western Ontario areas around Stratford and Beachville.

Participants in Ontario Hydro's farm sales department's annual farm tour visited everything from a cheese factory, 1,300-head beeflot. In between they saw a broiler poultry establishment, a swine-raising operation, and a large dairy.

Purpose of the trip was to see how electrical equipment helps the modern farmer.

municipal briefs

R. T. Williams, of North Bay, has been elected president of the Northeastern Region Association of Municipal Electrical Utility Officers. Other officers elected include G. A. Hall, South River, president; J. T. Cookson, North Bay, secretary-treasurer; Walmsley, Sault Ste. Marie, and M. G. Hewitt, North Bay, directors.

North York Hydro has included a four-page mailing insert in its latest bills advising customers of a 6 per cent rate increase effective July 1. The leaflet says the need for an increase was brought about by rising costs for labor, materials and associated services. It also points out that the wholesale cost of power is going up by 8 per cent.

A Halifax engineering consultant, A. E. Houghton, has been appointed Kitchener PUC's director of engineering and construction. Mr. Houghton, 41, worked for many years in Maracaibo, Venezuela, where he was vice-president and technical manager for Energia Electrica de Venezuela.

With the arrival of spring most of Burlington's residents have forgotten the ice storm which left some of them without power for up to five days in February. But Burlington PUC won't forget it very soon. The storm has dealt its final blow — a bill for \$9,000 to clean up the mess.

Another community project has come to the attention of Mississauga PUC's manager Roy Bishop and his staff, and they've wasted no time in offering their services. The latest spare-time under the big tent is organization and assistance in installing floodlighting for the town's William Croft athletic field. They plan to have the work done in time for Meaford's 9th annual intermediate school basketball tournament in August. The tournament is the largest of its kind in the province.

Lindsay Hydro has promoted its meter and service foreman Earl Moynes, to manager to succeed recently retired John Lightbody. Mr. Moynes has been a Lindsay Hydro employee for 21 years. Other promotions include office manager R. Ainsworth to secretary-treasurer, line foreman Jack Wilson to general foreman, lineman Don Sinclair to line foreman, and technician Glen Simmons to meter and service foreman.

Orangeville Hydro has said "thanks, but no thanks" to the Ontario branch of the Bank of Montreal for its offer to collect municipal utility bills. The offer to collect from the customers was turned down on the grounds that the utility "would lose contact with the people."



as don wright sees it

■ An interesting article appeared in a Toronto newspaper recently about industrial espionage and the security measures adopted by one computer firm to quarrel against competitor snooping. A spokesman for the firm said it was possible with modern technology for a properly equipped truck to park near an office building and focus a beam on the computer room.

If the people in the truck knew how the building's computer system is equipped, he claims, they could put all of its computer operations on tape and print it out for examination at their leisure.

Pretty neat, all right, but we do take exception to a part of the article which explains how this firm's computers are powered by electricity "drawn directly from the main Ontario Hydro grid" and then "purified."

Even the environmentalists cannot question the purity of our finished product. It contains no harmful ingredients and only top quality electrons are used in its manufacture. These are spiced with watts, joules, volts, amperes and what have you - under scientifically controlled conditions by master blenders with up to half a century of experience in the business.

The result - wholesome electricity guaranteed fresh and reliable or your money cheerfully refunded.

■ Triangular pants for the very junior set were near the head of the thundering herd of disposable products which were to follow. Hard on the odoriferous heels of these potty pants came throw-a-way pop bottles, flash lights, radios, watches, clothing and even cameras.

Latest glint in the affluent society's eye is an automobile engine so cheap to mass produce that it can be tossed away like a used tea bag instead of being subjected to major repairs.

Now if they can just come up with a good place to throw away all these throw-aways everyone will be happy - so long as it's in somebody else's back yard.

■ A skink, as we all know, is a small and harmless variety of lizard. Skinks are not rare in Florida and double-headed skinks have been found from time to time - with two heads on one end. But the poor fink of a skink found recently with a head on both ends and the legs going in opposite directions is considered a bit far out even for a skink.

One would normally expect the other end of a skink to come equipped very differently. Eating out of both ends must be a trifle unnerving even if closed cycle arrangements like this are the answer to our environmental problems. Sounds like this particular skink was put together by a committee possibly associated with Pollution Probe.

■ Time was when the traffic here in Toronto was vulnerable only to the most violent eruptions of nature. At least half-a-dozen snowflakes had to fall before transportation was reduced to complete and utter chaos. Now it can be programmed without any assistance from the weather.

Somewhere downtown squats a computer with a million tentacles reaching out to traffic signals across Metro and this electronic gizzmo can turn a sunny June morning into the traffic equivalent of a howling blizzard with a few burps from its ailing innards.

It doesn't happen all that often, perhaps, but there is something disquieting about a big city being all tangled up by a cabinet full of wire with a stomach ache. Looked down on from a great height, we must look like a colony of ants whose universe has been turned upside-down by a clumsy boot.

■ A recent editorial in Water and Pollution Control wonders whether or not the program to reduce phosphate in detergents has been an effective anti-pollution measure. And as the symbol for phosphate is P, the editorial comes to a reassuring if rather shocking conclusion.

"Certainly," says the magazine, "the limitation of phosphorus in detergents has reduced the amount of P that would have ended in the waterways."

Now, if we can only stop those people who P in their bathing suits the battle will be half won.

■ Almost anything is more important than a reliable supply of electricity these days if we are to judge by some of the reasons being put forward to halt the construction of generating stations south of the border.

One of the more recent roadblocks is a campaign by an environmental protection agency in the United States to keep a southern utility from building a cooling pond in connection with a new

electrical plant. Among the reasons - "this land must be preserved for use by alligators, wood ibis and roseate spoonbills."

No mention is made of the double-ended pink skink but his turn will come. ■ Noted for their love affairs with birds, beasts and all manner of peculiar fauna except man, the British are nonetheless taking a hard line with regard to quarantine policy. Virtually free of rabies for almost half a century, they want to keep it that way and a committee of inquiry on the dread disease has recommended that present, tough quarantine regulations should be reinforced - not relaxed.

True to form, though, they have left a loophole in the proposed new regulations which smacks to us of rank discrimination. Exemptions would be made for seals, elephants, dugongs and aardvarks.

What's a dugong? It's a monotypic genus of aquatic herbivorous mammals of the order Sirenia. If that isn't enough, these creatures are said to be distinguishable from the manatees by a bilobate tail resembling that of a whale, sport a less deeply cleft upper lip and grow tusks that sometimes exceed eight feet in length.


What's a manatee? Never mind. The point is - these babies won't be quarantined and if we were a quarantine officer we'd be inclined to go along with the decision.

■ Retirement planning is very important and Ralph Fisher, who recently retired as Cobourg area manager after 44 years with Hydro, has done a masterful job. Commenting on his security measures, he said:

"I should be well looked after. My son has his degree in medicine and a fellowship from the Royal College of Surgeons. My daughter-in-law has her degree in medicine and is a specialist in anesthetics. My elder daughter has her nursing degree and my younger daughter is medical secretary to an eye surgeon.

"If they cannot be of assistance, I can always rely on my brother-in-law who is a funeral director."

Now, if Ralph has any unmarried daughters and he can get one interested in a man of the cloth - he'll have all the angles covered. □

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VIEWPOINT

Dr. Solandt reports

Dr. Omond Solandt had both good news and bad news for Ontario Hydro in his report on the planned Nanticoke to Pickering extra high voltage transmission line.

The good news was that Dr. Solandt believes Hydro has satisfactorily established the need for the line, the necessity of transmitting power at 500,000 volts, Hydro's reasons for rejecting underground transmission and the need to continue the carefully controlled use of herbicides. As for the bad news, there will be delays in the construction of the line while further studies are conducted to find the best possible route.

Dr. Solandt indicates that the delays will cause hardship. They will mean indecision for property owners, some of whom have been waiting three years for their land to be purchased. Extensive delays may have even more serious consequences for Ontario's power users because the line will be the backbone of the entire power network in Southern Ontario.

Lacking further hydro-electric sites, the province must rely on thermal plants to supply an electrical load growing at a rate of about seven per cent annually. The best place to locate these plants, within a reasonable distance of the load centres, is along the shores of the deep, cold Great Lakes. This being so, the power lines required to move big blocks of power from the giant new generating stations to the points of use must pass through some of the most visible, verdant and valuable countryside in the province.

Commenting on the difficulties encountered by Hydro in reaching agreement with involved municipalities, Dr. Solandt says he believes that, in part, they arose from the remarkable lack of homogeneity in population along the proposed routes.

"In a small city, the urban dwellers form a reasonably coherent social group that is distinct from the rural community in which the city is embedded. Even the suburban outgrowths of the city have more in common with the city than with the country. However, as affluence increases and roads improve to the point where relatively long-distance commut-

ing by private transportation is possible, a new species, the rural estate owner, begins to appear.

"The term appears to be used not as in the past to indicate a very wealthy person, but rather to indicate a person whose economic roots are in the city and who has chosen to live in the country often primarily to enjoy the relatively undisturbed natural environment. Inevitably, these two groups come into local conflict. The true rural resident has long looked forward to the advent of 'development' to bring him the amenities of the city. The rural estate owner is strongly opposed to most 'development' because it destroys the values for which he moved to the country.

"It seemed obvious to me that many of the difficulties encountered by municipal councils and planners arose from this dichotomy of interest."

No one can suggest that the green fields and rolling hills of Southern Ontario will be enhanced by the addition of transmission lines and public concern with Hydro's new power corridors is understandable. Equally indisputable is the need for power when and where it is required. Nothing could be more disastrous to the economic and social welfare than a shortage of electricity.

However, the Solandt Commission feels the risk of some delay in the construction of this line is acceptable and suggests that additional studies examine not only the three alternative routes proposed by Hydro but look at other possible routes too.

"The main conclusion that I have reached as a result of the evidence presented to the Commission is that while Ontario Hydro has demonstrated that the middle route they have selected is not a completely unsatisfactory route for the proposed power line, they did not produce adequate evidence to support the view that it is the best available route," says Dr. Solandt.

Later in his summary, he adds: "Unfortunately, it is almost certain that if a more extensive and careful study leads to the selection of a route that is radically different from the middle route, the delay

in building the line would be at least two years rather than one. Therefore, should the Government decide to recommend a study it would be prudent to ask Ontario Hydro to prepare emergency plans for deferring construction for two or three years or for constructing the necessary lines in stages."

The question is, what now? Assuming the Government accepts the Solandt recommendations, further studies will go ahead under the authority and direction of Dr. Solandt and probably involving conservationists, concerned citizens, municipal officials and planners. The new studies will be conducted by Bruce Howlett, a United States planning expert and a former planner for the city of Edmonton. As the Solandt Commission points out, such studies will require a great deal of activity and goodwill on all sides if the goal of completing a line with acceptable social, environmental and economic costs can be achieved within the required time. For its part, Hydro will co-operate fully with all groups to arrive at a suitable solution. □

This is the first bi-monthly issue of Hydro News. We hope you enjoy the revised format and in-depth approach to subjects in the news. The magazine will appear six times a year. We regret that labor difficulties made it impossible for us to publish a September/October issue, but conditions have returned to normal and the magazine will appear on a regular basis from now on.

CANDU & sons

by Les Dobson

Surrounded by the forests which blanketed much of the gently rolling land skirting the Winnipeg River is a cluster of buildings that collectively form the Whiteshell Nuclear Research Establishment.

At Whiteshell is a reactor capable of producing enough power for 26,000 homes. The plant has been in operation for five years, but it has never produced a kilowatt of electricity. It is not connected to a generator and no high-voltage transmission lines fan out from the complex.

WR-1, as the reactor is prosaically called, is purely for research purposes. It differs from any other reactor operating in Canada today in that it uses an oil-like substance instead of water for transferring energy, in the form of heat, from the reactor core. It also uses enriched uranium in contrast to the CANDU family of natural uranium-fuelled, heavy water moderated reactors.

W. Bennett Lewis, a senior official of Atomic Energy of Canada Limited, is enthusiastic about the "astonishing" performance of WR1. "After five years of operation, the radioactivity in the primary coolant circuit is negligible, and one can stand alongside the pumps in this circuit with the reactor at full power in a negligible radiation field," he says.

"Any coolant leaks expose themselves and, because the circuit is inactive, repair is only limited by temperature – as in an oil refinery. Such things are impossible in any water-cooled reactor."

Does WR-1 point out the evolutionary path Canada's fledgling nuclear industry will take? Or will it quickly be superseded by more exotic nuclear contrivances such as breeders, which produce more fissile material than they consume, or the theoretically possible but as yet unattainable controlled fusion reaction which would harness the very energy process of the sun and stars?

Most authorities feel there will be no dramatic change in Canada's nuclear power program. They agree that the CANDU concept is so suited to Canadian conditions it will be around until the year 2000 and beyond. Nuclear experts were amazed at the ease with which the 500 megawatt units at the Pickering station

on Lake Ontario were commissioned and are delighted with their subsequent performance. Even larger 800-megawatt units are being installed at the Bruce Nuclear Plant on Lake Huron and it appears likely that the CANDU pressurized heavy water reactor will be built for many years to come.

Dr. J. S. Foster, AECL vice-president of power projects, predicts that Canada will opt mainly for heavy water reactors over the next 25 years, with or without enrichment. Further light water reactors may be built — the prototype Gentilly plant, which substitutes boiling light water for heavy water in the energy transfer process, produced full power in Quebec earlier this year. Dr. Foster also foresees a trend to larger units of perhaps 1,200 and even 1,800 megawatts.

Studies already under way by AECL and Ontario Hydro will examine the economics of both repeating existing station design and improvements to the Bruce design. The feasibility of going to 1,200 megawatt units will be a part of the studies, which will also investigate alternative reactor concepts.

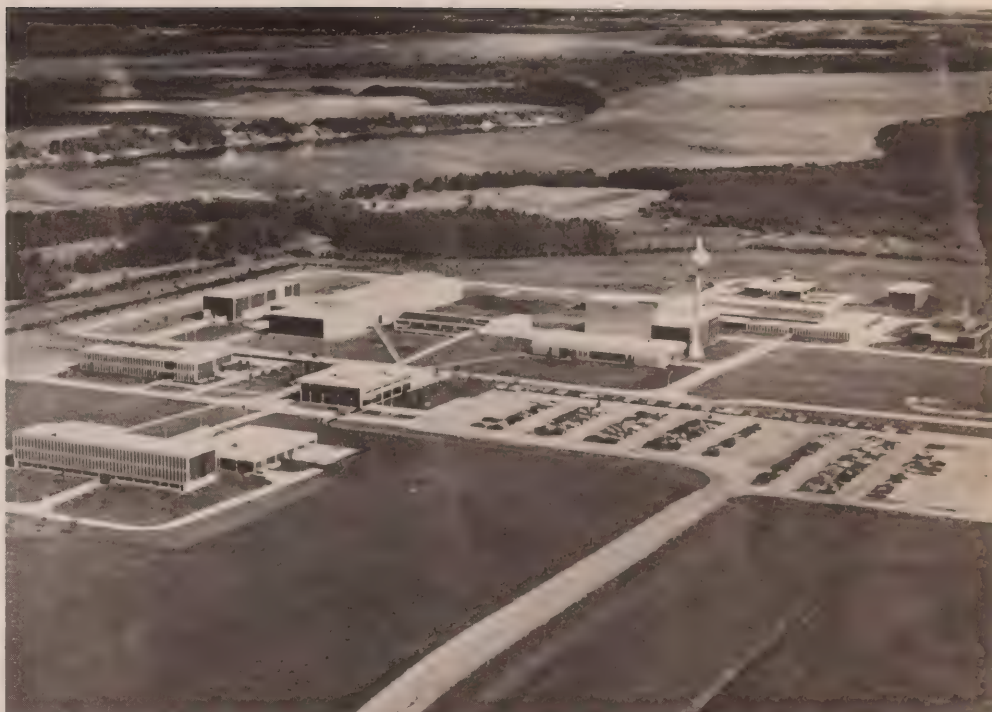
The basic concept of CANDU has gone unchanged for 15 years. Heat from a heavy water reactor is obtained from the fissioning of natural uranium fuel in the form of pellets contained in clusters of zirconium alloy tubes installed in zirconium alloy pressure tubes in a calandria vessel.

Variations on this theme are likely, for the state of the nuclear industry today bears comparison with the automobile industry between the two world wars . . . reliability improves with every, or nearly every, new model.

Boiling light water reactors, like the one installed at Gentilly, promise slightly higher efficiency together with lower capital and running costs because of the need for less heavy water. Further advantages may be gained by going to organic-cooled reactors like WR-1. But the likelihood is that Canada will still be building some type of CANDU reactor 30 years from now.

Within Canada, there's a great deal of current interest in CANDU. Hydro-Quebec

Organic-cooled experimental reactor at the Whiteshell Nuclear Research Establishment in Manitoba has drawn enthusiastic comments from Canada's nuclear community.



has decided to build a 600,000-kilowatt plant on the same site as Gentilly 1 while officials in New Brunswick are considering the construction of two 600,000-kilowatt stations, partly to supply the power-starved U.S. eastern seaboard.

Prospects for developing export markets for the CANDU pressurized heavy water reactor have brightened considerably with the success of Pickering.

"Our marketing job has been made easier with recent progress in bringing heavy water production plants and Pickering reactor units into service," says an AECL official. "The reactor units are demonstrating that large CANDU-PHW plants not only work but work exceptionally well."

CANDU reactors are operating successfully in both India and Pakistan, but hopes for other overseas contracts have so far failed to materialize. Decisions on whether to build CANDU stations have been postponed by both Australia and Romania. Argentina is currently studying a tender for a 600-megawatt plant submitted by AECL and Italmipianti, an Italian engi-

neering company. AECL also expects to be invited to bid on a station for Italy early next year.

While CANDU may dominate the Canadian nuclear scene for the foreseeable future, this is not to say that breeders will not be built. It may well be that the Canadian nuclear industry will get into the breeder business, if only to maintain a well-integrated technology. However, little incentive is seen right now for investing in major alternatives to CANDU.

The majority of reactors being built throughout the world consume enriched uranium and are cooled by light water. This type of reactor is extravagant in the use of uranium, but is expected to fill the energy gap in the U.S., Europe and Japan until breeders become a commercial reality. It's expected that fast breeders will extend the world's resources of fissile uranium as much as 40 times.

In Canada, the need for breeder reactors is not as pressing. The CANDU reactor is extremely economical on fuel and Canada has one of the world's largest deposits of uranium with reserves of high and low-

The ease with which the 500-megawatt units at Pickering generating station on Lake Ontario were commissioned took even the experts by surprise. In the light of Pickering's success, it appears likely that the CANDU pressurized heavy water reactor will be built for many years to come.



grade ore estimated to last at least a century.

On the other hand, J. Howieson, engineering manager for Westinghouse Canada Ltd., feels that CANDU technology could lead naturally to the building of a fusion reactor.

"It is known that deuterium is one of the fuels for fusion and that neutrons are one of the major forms of energy released," he says. "Canada is willy-nilly in the forefront of deuterium production technology and the CANDU system is the best way to convert neutrons to useable power. It is recommended that this line of thought be explored.

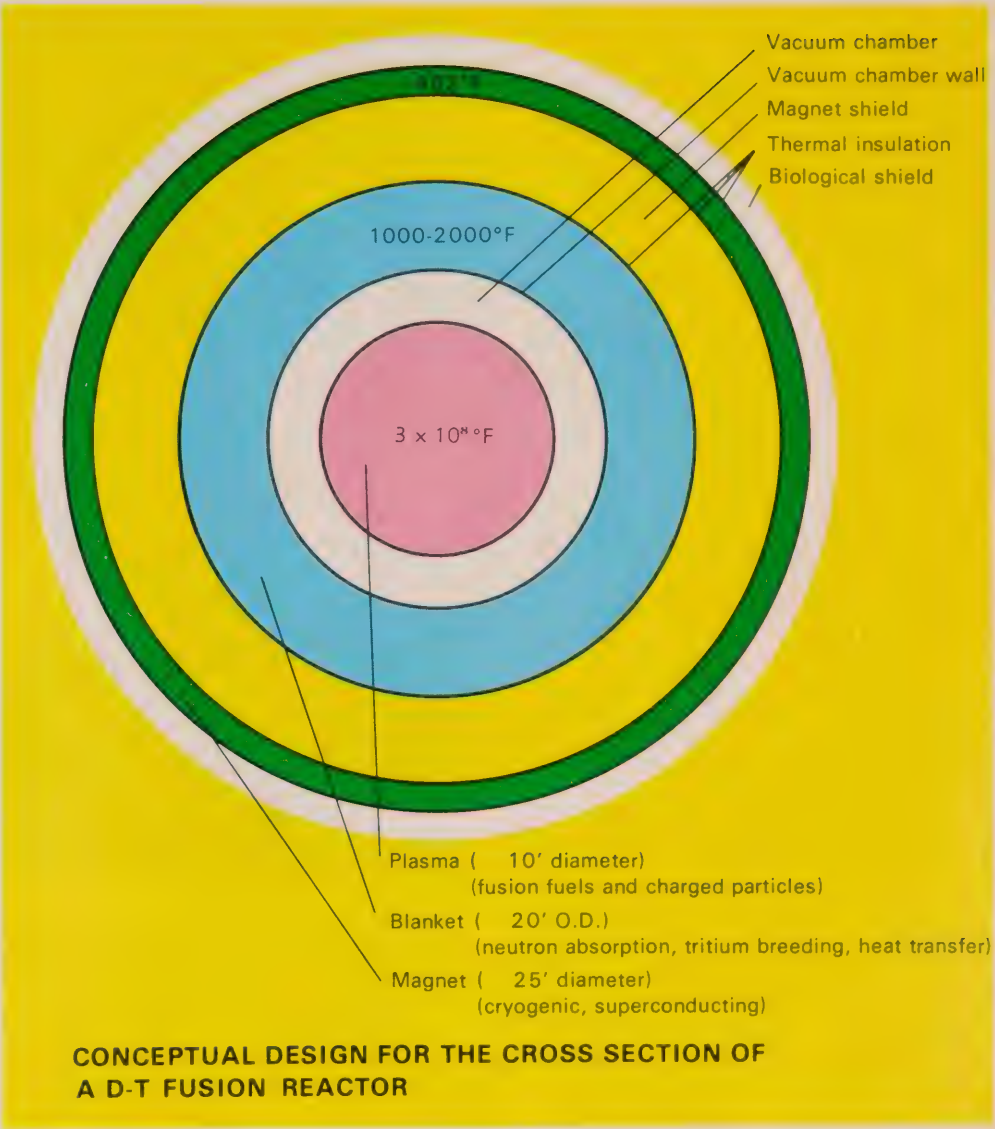
"If fusion is an economic fact in 30 years — as several eminent experts have predicted — Canadian technology in these areas could, and should, be a part of it."

Certainly, Canada has perforce been plunged into heavy water production on a commercial scale to satiate the appetite of the CANDU reactor. Each of Pickering's four reactors requires 490 tons of this exotic substance while Bruce will need a further 2,680 tons before its completion later this decade.

To meet the demand from these and other CANDU stations, three heavy water plants are either completed or under construction. Despite initial production difficulties, the Canadian General Electric plant at Port Hawkesbury, Nova Scotia, is now yielding a steady flow of precious deuterium fluid while the ill-fated plant at Glace Bay, N.S., is undergoing a \$90 million reconstruction to bring it into production.

In Ontario, an 800-ton-a-year plant is at the commissioning stage on a site adjoining the Bruce generating station. The Ontario plant alone will dwarf heavy water production in the United States, whose installation at Savannah River, South Carolina, has a capacity of only about 200 tons a year.

Heavy water would play an important role in fusion reactions which are possible between either atoms of deuterium and tritium or between two deuterium atoms. In the process, new material is formed of less total mass than the original atoms and the small loss of mass is converted into



How fusion works

energy according to Einstein's now famous equation, $E = mc^2$.

More energy is released in an individual fission reaction, in which the atoms of one of the heavy elements are split apart, than in the fusion of two light atoms. However, fusion reactions promise high efficiency, no chemical pollution, and an inexhaustible supply of fuel. It's estimated that the oceans contain enough deuterium to last a billion years.

The problem at the moment is confining the fusion elements at the extremely high temperatures required to sustain a reaction. Temperatures greater than 100 million degrees centigrade must be maintained for about one second, and no known material could withstand such searing heat. Scientists believe the answer lies in containing the fusion plasma within a strong magnetic field. Work in those countries experimenting with controlled fusion reactions is following this line of thought.

No one can predict when the breakthrough will occur, but it seems likely that the commercial-scale fusion reactor will be a product of the 21st century rather than the 20th. In the meantime, the CANDU reactor has a vital role to perform.

Says Dr. Lewis: "A very considerable body of literature and scientific evidence is building up that nuclear power is the only practical means of providing the energy needed to grow the food required in the future to nourish people already born. As long as the world population growth can be checked, so that the population does not exceed say 15,000 million, CANDU reactors alone could promise for many thousands of years plenty of energy for food, water, clean air and comfort for man and his environment."

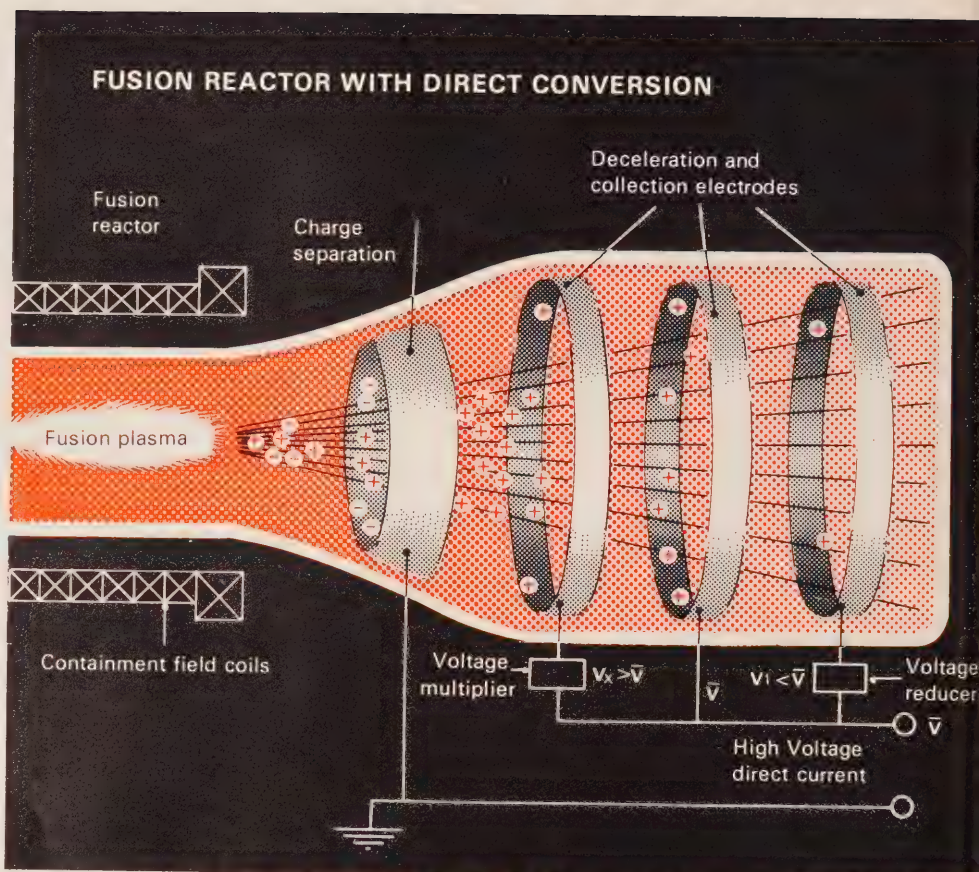
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A typical fusion reactor might operate on a mixture of deuterium and tritium, each deuterium nucleus fusing with a tritium nucleus to form helium-4 and a neutron.

In one method under investigation, the deuterium-tritium mixture would be admitted to an evacuated chamber and there ionized and heated to thermonuclear temperatures by passing an electric current through the plasma. The plasma itself would be contained by a powerful magnetic field.

Charged helium nuclei formed during the process could collide with newly-injected atoms of cold fuel, ionizing and heating them to sustain the fusion reaction. The neutrons, having no charge, would move in straight lines through the thin walls of the vacuum chamber to be absorbed in a surrounding blanket of lithium or lithium fluoride.

Heat generated in the wall of the vacuum chamber by collision with the



fused helium nuclei and by the many collisions of neutrons with lithium nuclei would be removed by a heat exchange and conveyed to a conventional steam electric plant. One promising method now under investigation in several countries is the use of a high-powered laser beam to heat lithium deuteride pellets to the extremely high temperature where fusion will occur.

A further refinement, particularly in the case of a deuterium - deuterium reaction might be the direct conversion of energy into electricity by focussing the stream of charged particles through a series of electrodes. Under such a system, the steam cycle would be avoided with a corresponding increase in efficiency.

□

Neutron supply key to breeder

Thermal reactors may employ graphite, heavy water, light water, or beryllium to slow down or moderate the fast neutrons released upon the fission of U-235 atoms and thus promote a chain reaction. They also create a certain amount of new fissionable material because some of the neutrons are captured in U-238 atoms, converting them to fissionable plutonium-239.

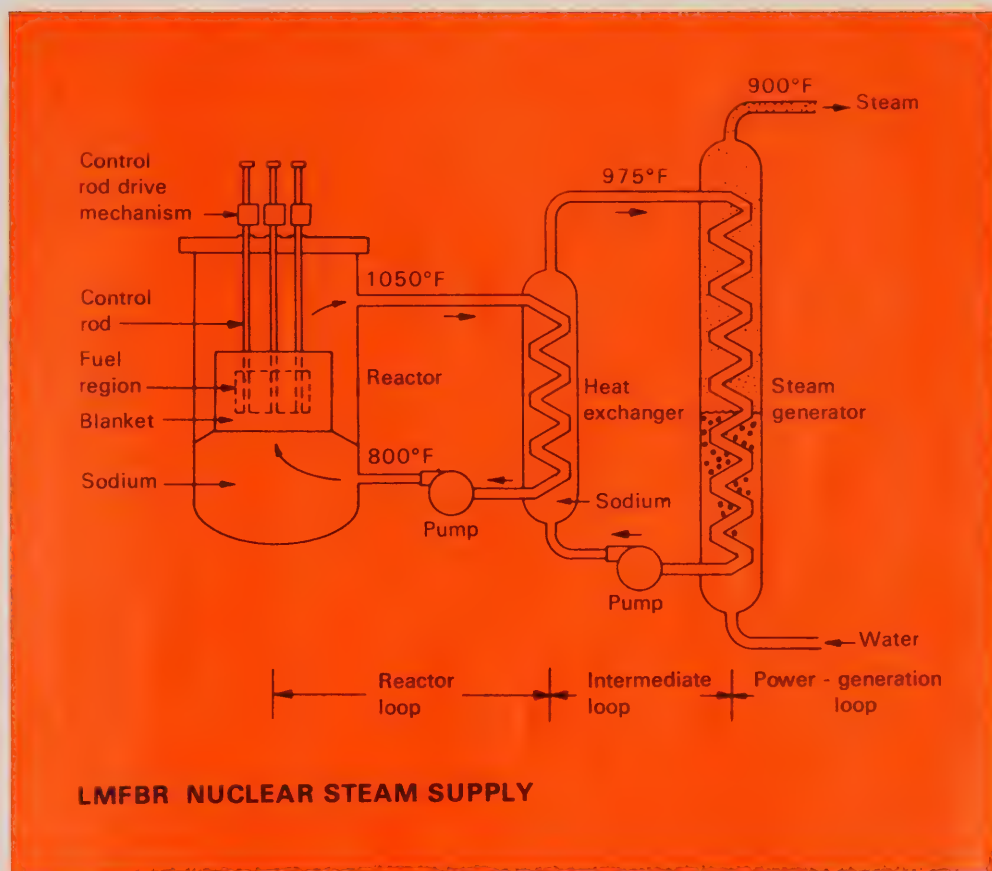
Theoretically, a breeder reactor should be capable of converting all its supply of U-238 into plutonium. In other words, it could fission all the uranium mined. In practice, various losses would probably reduce this to a more meaningful 70 per cent.

The key to the amount of U-238 converted to plutonium is the number of neutrons available in excess of those required to maintain the chain reaction. As early as 1944, it was evident that the fissioning of plutonium released a larger number of excess neutrons in an unmoderated or "fast" reaction than in a thermal or "slow" reaction. The earliest fast breeder released high-speed neutrons into a natural uranium blanket, producing more fissile material than it consumed.

An alternative method is to use a blanket of thorium-232 which is transformed into fissionable U-233 when bombarded with neutrons.

An experimental fast breeder at Dounreay, in Northern Scotland, has been in operation for some years while a prototype 250,000-kilowatt fast-breeder station is due to enter service in 1973. The Soviet government recently announced the completion of a 350,000-kilowatt breeder reactor at Shevchenko on the Caspian Sea.

The U.S. Atomic Energy Commission announced early this year plans for a demonstration breeder plant to be built in Tennessee by Commonwealth Edison, of Chicago, and the Tennessee Valley Authority. The only other breeder reactor of any size in the U.S. is the Enrico Fermi liquid-metal fast breeder at Monroe, Michigan. The reactor was out of service for nearly four years after a blockage in the coolant flow resulted in the partial melt-down of two fuel sub-assemblies. □



THE METEORIC RISE OF THE JET~SET GENERATOR

by Bill Settatree

Seven years ago, they were merely a standby. Now these power packages have earned a place with nearly every major utility.

Combustion turbine engines like those which lift huge airliners into the stratosphere are taking on increasing importance in the electric utility industry.

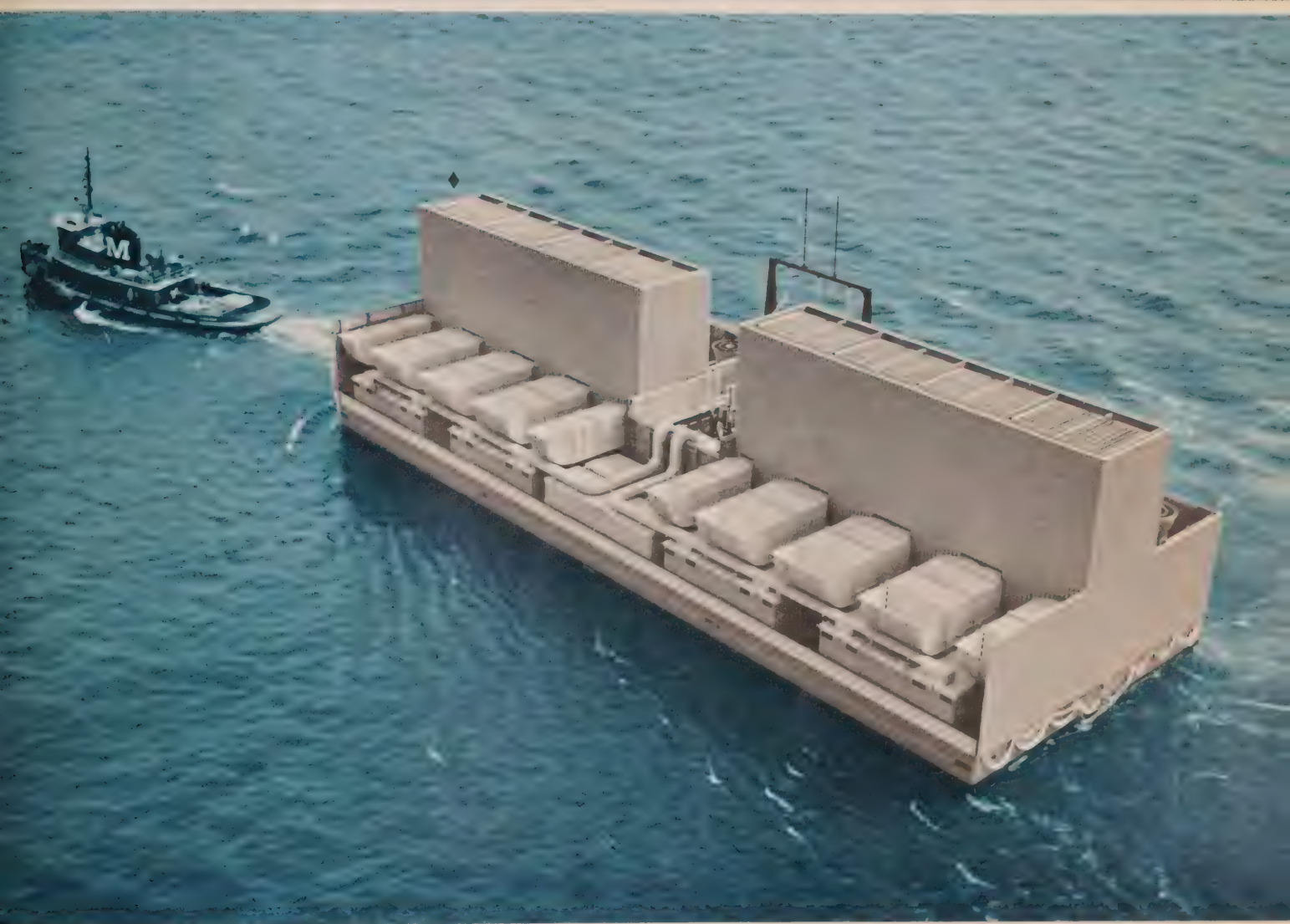
Since the great blackout of November 9, 1965, most utilities have joined the jet set and are using aircraft-type combustion turbines to augment their systems.

Instead of steam, as in a conventional turbo-generator, these units rely on rapidly expanding hot gases from the combustion of distillate fuel oil for their motive power. They are started either by small diesel engines or direct current motors supplied by batteries.

Their major use to date has been to provide emergency power for generating stations and to help meet peak demands. They rapidly reach full power and can be producing electricity in a matter of minutes in comparison to several hours at conventional fossil-fuelled stations.

Stand-by power is basically a means of starting up much larger turbine-generators if no other source of electricity is available. Power plants, like any industrial establishment, require electricity to operate. In fact, between 3 and 5 per cent of the output of a modern thermal station is required to power the station itself. Should the generators be knocked out and supplies from the rest of the grid are not available, stand-by units are required to restore the plant to service.

Gas or combustion turbines were more or less ignored by the larger power producers prior to the 1965 blackout. A few small utilities had them, but the market was thin and many units sat collecting dust on manufacturers' premises.



Tugboat tows barge-mounted combustion turbine units into New York Harbor. Floating generating station is helping Consolidated Edison meet peak demands.

Ontario Hydro was one of the first large utilities to show an interest in combustion turbines, and placed orders in the summer of 1965 for six large units with capacities ranging from 17.5 to 19.5 megawatts for installation at the A. W. Manby and Sarnia Scott transformer stations. These were to help meet the peak load during the coming winter.

After the blackout, utilities began buying gas turbines for installation in power plants as stand-by units. Hydro also ordered small jet-engine turbines for its thermal stations.

Ontario Hydro now has 33 combustion turbine-generators with a capacity of 372,500 kilowatts, enough to supply the electrical requirements of a city the size of Hamilton. However, this electricity costs about twice as much as conventional generation.

Combustion turbines at transformer stations are connected directly to the transformers while those at generating stations are connected to the station bus. Because of their capability of rapid start, they provide insurance for the restoration of generating station service in the event of a power interruption. Combustion turbines at transformer stations can feed power almost instantly into the grid to ease peak load problems.

Each of Hydro's turbine units has storage for half a million gallons of oil. The annual total fuel consumption is approximately 30 million gallons.

Ed Holdup, thermal operations manager, says it was almost by accident that Hydro came to install combustion engines. An unexpected increase in power demand,

coupled with an earlier decision to delay completion of the Lakeview generating station west of Toronto, called for a stop-gap measure. Because of their availability for immediate installation, combustion turbines were the only choice.

A similar situation to that which Hydro faced in 1965 is partly responsible for the growing interest in combustion turbines by other utilities today. Such units gained more popularity in the late 1960's when utilities were faced with shrinking fuel supplies, particularly coal.

"In 1969, we were 1.75 million tons of coal short and the combustion turbines picked up most of the slack," says Mr. Holdup.

Delay in the completion of nuclear plants is a prime reason for what authorities call the "forced popularity" of gas turbines in the United States. Unexpected load growth is another reason behind the changing generation mix.

Generation mix is a term utility people use to describe the balance between the various methods of producing power — hydro-electric, fossil-fuel and nuclear. The latter is ideal for supplying base or continuous load. Hydro-electric plants, on the other hand, are easily turned on and off and are suitable for meeting short-term fluctuations in demand. Fossil-fuel stations fall somewhere in between. A good generation mix also ensures all a utility's eggs are not in one basket should a critical fuel situation develop.

Hamstrung by the delaying tactics of environmentalists opposed to the siting of new plants and faced with a worsening

power shortage, Consolidated Edison in 1970 made arrangements to lease four floating generating stations from a leading manufacturer. Moored in New York harbor, the barge-mounted combustion turbine units are now cranking out 622 megawatts for New York City and Westchester County.

As additional conventional generation is added, Con Ed may transfer the lease of its floating units to another utility. This mobility is one of the most important features of the barges. It allows Con Ed to introduce more peaking capacity without using the expensive real estate of New York.

Triggering increased interest in recent months is the new and more efficient combined-cycle combustion turbine. This differs from the simple gas turbine in that waste heat is trapped and used to generate steam which is then harnessed to create additional electricity.

Britain's Central Electricity Generating Board views the combined-cycle turbine as an answer to the problem of re-equipping old power stations in which the boiler need replacing but the steam turbines have many years of useful life.

Ontario Hydro is evaluating the combined cycle idea, and Mr. Holdup says the Commission is considering such a unit in connection with the expansion of the Thunder Bay generating station. However, a decision is still a long way off.

At least two proposals on combined cycle turbines have been advanced to Hydro. One, from Westinghouse Corporation, involves the installation of the so-called PACE (power at combined efficiencies) unit. This is a pre-designed and packaged

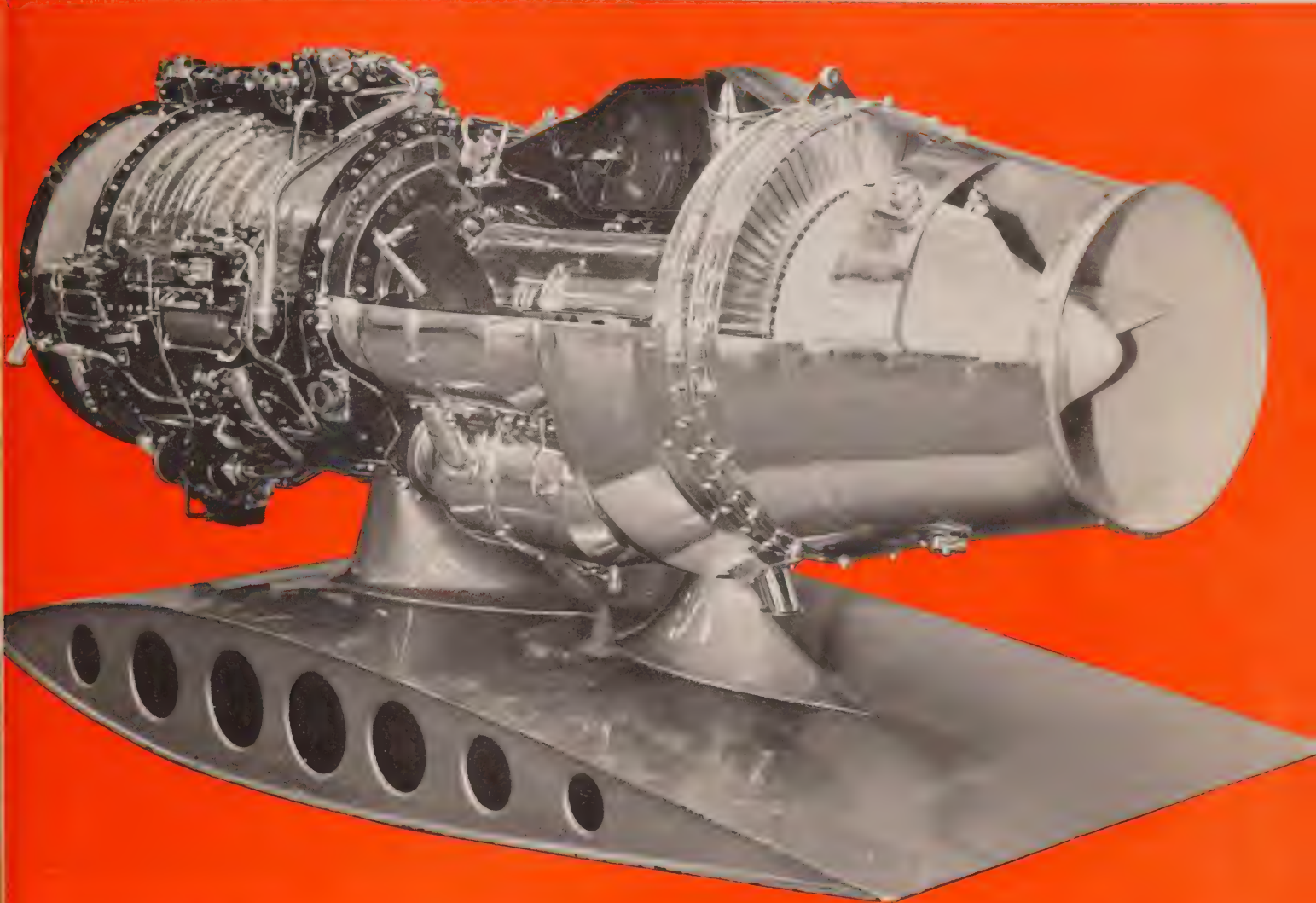
plant installed to operate in the 2,000 to 5,000 hours per year range and offers a 260-megawatt capacity on less than an acre of land.

General Electric offers a unit which it calls STAG (steam turbine and gas). It comes in basic units of 200, 300 and 400 megawatts. Both systems feature rapid start-up and can be brought on load in a matter of minutes.

Combined-cycle units of various configurations have been utilized in industrial plants for years, but were never before considered by the utility industry. Hospitals and large commercial buildings use them for stand-by plants.

Now, with peaking problems requiring the operation of simple-cycle gas turbines beyond economic durations of more than 500 to 700 hours a year, use of the exhaust heat from the turbines themselves to generate steam and operate a turbo-generator becomes meaningful.

Manufacturers suggest that in addition to the savings accrued through factory fabrication, on-site labor costs can be materially reduced with combined-cycle plants. A prime advantage, they stress, is that utilities do not have to tie up large amounts of capital at high interest rates over construction periods of several years. Combined-



In modified form, this Orenda jet aircraft engine is used to produce 6,000 kilowatts of electricity. Combustion turbine units of this type are installed at some of Ontario Hydro's largest thermal stations.

cycle plants can be readily installed in a year or less.

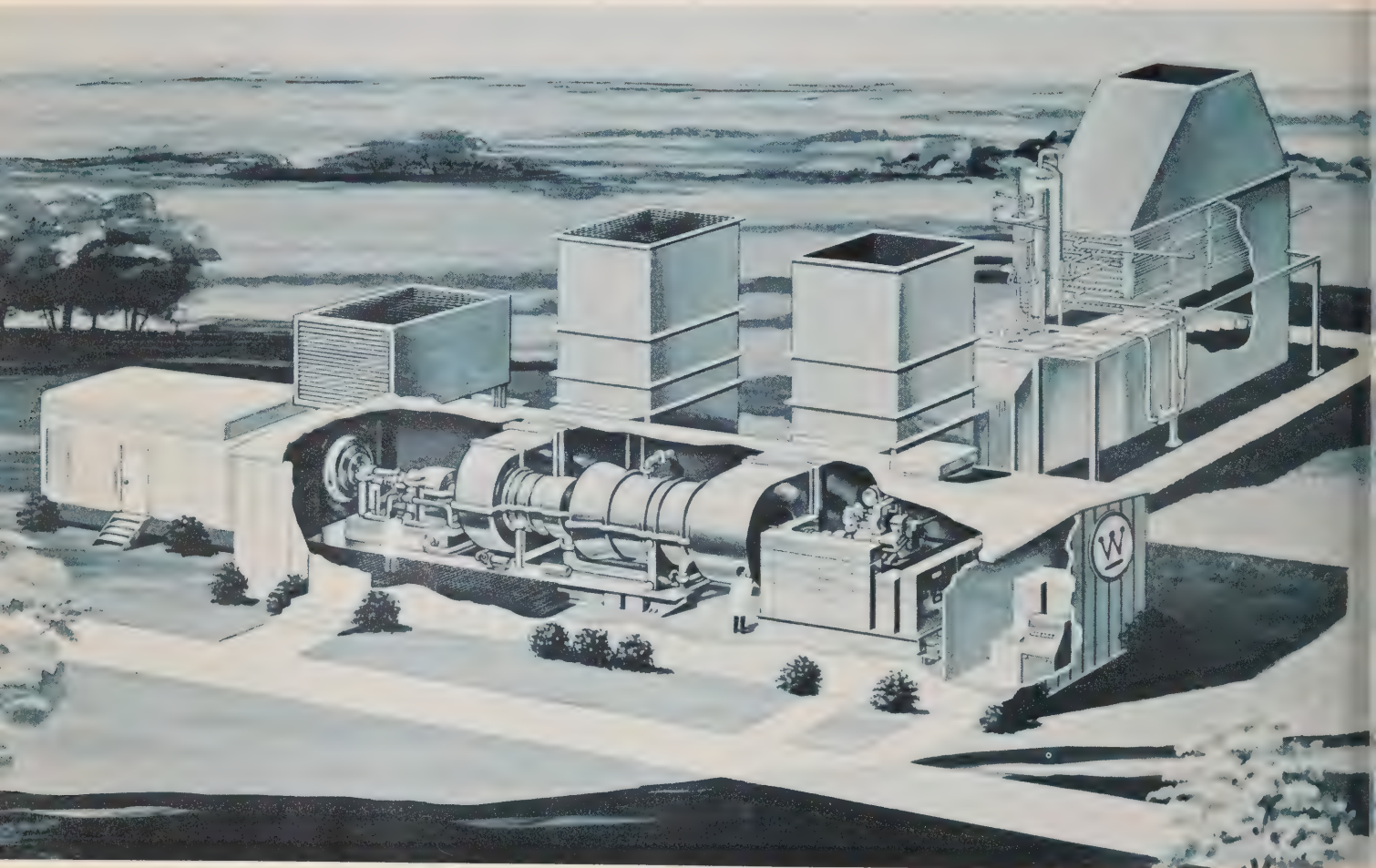
But system planners are concerned about an uncertain fuel situation and maintenance problems. Mr. Holdup says natural gas would be an ideal fuel, but the Canadian supply situation is uncertain. It is even worse in the U.S. Maintenance has been high in the smaller units and there is no guarantee the combined-cycle plants will be any different.

One answer to the fuel question could lie in the gasification of coal, a route being explored by Westinghouse. The research is being done in conjunction with the U.S.

government and several utility partners. One company executive recently said "Coal gasification has to work. The alternative is extremely high cost for electric energy."

Manufacturers of combined-cycle plants also emphasize that their units take up such little space they can be located almost anywhere. Westinghouse has gone as far as to suggest that its PACE plant could be compatible with residential surroundings.

While some engineers argue that combustion turbines have major potential because of their minimal effect on the environment, this argument is not fully subscribed to by



Artist's impression of the Westinghouse PACE (power at combined efficiencies) combined-cycle unit. Waste heat from the gas turbine is trapped and used to generate steam, which is then harnessed to create additional electricity.

others in the industry. Mr. Holdup, for instance, agrees that while some exhaust gases are eliminated other pollutants take their place. Noise is another problem with what is basically a jet aircraft engine. Men working near such units are required to wear earmuffs. Special equipment helps to muffle the sound outside.

Only a dozen or so combined-cycle combustion turbines are in use by utilities on this continent today. But a marked increase in interest is visible.

While Hydro and others remain skeptical because of the lack of operating experience with such units, the manufacturers themselves are enthusiastic. Fairly large combined-cycle installations are being built in Burlington, N.J., Taunton, Mass., and Oklahoma to mention a few.

There are those who suggest that the fossil-fired steam plant is on the decline as the success and popularity of nuclear power grows. Fossil plants would remain an integral part of the generation mix, but not on as large a scale as those being built today. The suggestion is that combined-cycle units will gain in popularity.

"We're not involved with combined-cycle yet, but I'm sure it's going to come because of the growing need to conserve fuel and reduce atmospheric pollution," says Walter Bellian, sales and services manager for Orenda Limited of Toronto.

Orenda supplied 19 of Hydro's small turbine-generators and has found a substantial market across the country.

Mr. Bellian said his firm is using waste heat from its installations for hot water systems, but the size of the units them-

selves negate their use for combined-cycle plants. The company provided 18 seven-megawatt units for the Pinetree radar line in which the waste heat principle is employed to provide hot water. There are also two Orenda combustion-turbine units at Disneyworld in Florida. These Canadian-made machines have become the basic power source for the amusement park and its mono-rails. Mr. Bellian says the waste heat from the units provides enough hot water for all the hotels in the complex.

John McCullum, marketing manager of Canadian Westinghouse's combustion turbine division, foresees combined-cycle units being utilized by Canadian utilities in rehabilitating older and smaller fossil-fuelled power stations as is the case in Britain.

"There has been considerable curiosity here, particularly on the east coast where there is such a dependence on oil fuels," he said.

Mr. McCullum noted that his company's combined-cycle development dovetails with its research into the gasification of coal. He suggested that when this problem is resolved, combined-cycle units would become more popular particularly in remote areas. He suggests such facilities would make the use of gasified Ontario lignite more practicable.

Some industries in Canada are already utilizing combined-cycle systems to take advantage of waste heat from their plants. The most significant of these is Dow Chemical at Sarnia where combined-cycle has been adopted for in-plant operations taking advantage of existing steam boilers.

"If energy economics is the watchword

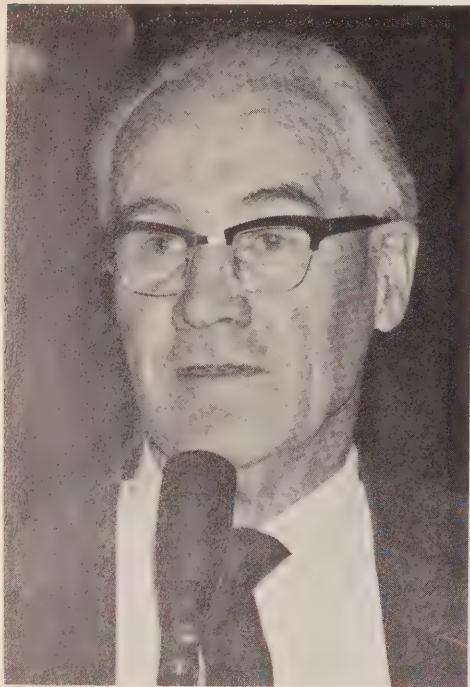
of the future, waste heat recovery, such as that developed through combined-cycle plants, will help to keep the costs of electricity down," Mr. McCullum said. He suggests that in the future utilities and industry may work together — industry supplying the waste heat from its manufacturing operations for the utility to use in the generation of electricity by combined-cycle units.

Even more sophisticated is an idea for multi-cycle units which would boil liquid potassium to drive a second turbine, the exhaust gases of which would create steam to drive a third turbine. □

the energy

Grim prospects for Ontario

by Dr. R.H. Hay



Dr. Hay, a retired physicist, is the OMEA's representative on the Ontario government's Advisory Committee on Energy. His article is based on a speech he made at OMEA district meetings across the province this fall.

Like the prodigal son of Biblical parable, the millionaire playboy or the proverbial drunken sailor, we in North America have been spending our energy capital – the world's stores of fossil fuels – with reckless abandon. As a result this whole continent faces an energy crisis. Energy shortages, already apparent in the United States, will spill over into Canada with implications of higher prices and the need for policy direction. No longer can we assume that when what we have is gone we can get lots more from wherever it may be.

We in Ontario, who import 83 per cent of our energy requirements from outside the province, will be the first in Canada to feel the impact of this grim prospect. We may, indeed, feel the

pinch as early as 1975. When it comes to energy resources, we are the have-not province.

So what, you say. Surely we're still part of Canada and surely Canada is rich – fabulously rich – in coal, oil and gas reserves. Just look at Alberta, the province with all Hell for its basement, to paraphrase Rudyard Kipling's description of Medicine Hat. Well, it looks as though the day of the big finds is over. They're no longer finding gas and oil in Alberta at the rates they did in the fifties and sixties. The rate of discovery no longer matches the rate of increase in consumption. Excluding the Mackenzie delta and the Arctic Islands, Canadian gas reserves will last us only another 20 years at today's rate of use. Crude oil will last to just beyond 1980 and only the Athabasca Tar Sands will extend that to 1995 to 2000.

The frontier reserves in the Arctic look large, but how do we get them to market? How much of them do we give in tribute to the United States in return for the capital required to build the required transmission facilities? Nor can we hope to import from world sources because the world picture is no better.

With no indigenous source of energy but hydro-electricity, Ontario has built the most productive sector of Canada's economy and its most diversified and broadest. But we are also the most vulnerable to the energy crisis that has hit the United States. Unless we move with wisdom as well as swiftness and boldness the black-outs, the brown-outs and the shortages will be upon us, too.

The only bright star on our horizon is the promise of *successful* exploitation of the CANDU system for nuclear power generation – a promise amply supported by the success of Pickering nuclear generating station.

But why the crisis and why should it come first to the electrical supply industry? For the same reasons that it has arisen in the United States:

First and foremost is an acceleration in the rate at which energy is being used, and the greatest rate is for elec-

trical energy. In Ontario, our present rate of growth for energy as a whole is 4.6 per cent but 7.1 per cent for electricity.

Second is the sudden and dramatic impact of concern for the environment – the conflict between industrial and economic "growth" and the desire for a "risk-free" environment.

Third is the cost of meeting the demand.

Fourth is the increase in general public awareness that the conventional energy sources are far from inexhaustible. Where do we turn for more? What, in national and world terms, is our share?

These factors are really inseparable. We cannot talk about any one in isolation from the others. Nor will it do any good to take extreme positions on any of these problems. As one prominent and knowledgeable American has said, "... every stage in the production, conversion and utilization of energy involves actual or potential environmental degradation; thus, meeting future energy needs, by whatever means and in whatever pattern, will require a trade-off between alternative adverse impacts. There is no way of avoiding such impacts, they can only be minimized – a fact, I am sorry to say, the public has not yet appreciated."

The increase in the use of energy in North America is no new thing. What is new is the latest upward tilt in the curves and in the relationship between gross national product and energy use. This relationship reveals the effect of price increases, but more important a decrease in the improvement in the efficiency of use of energy and this, in part, can be attributed to the efforts of the environmentalists. And, to an extent not at all generally appreciated, the reduction of pollution and protection of the environment will of themselves materially increase the demand for electricity.

I agree that sometime, somehow and sooner rather than later we must turn

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crunch

Nuclear bridges the generation gap

by D.J. Gordon



Douglas J. Gordon, Ontario Hydro's general manager, presented this paper on the philosophy behind the nuclear power program at a recent fuels planning conference in Toronto.

Some provinces in Canada are still fortunate to have major undeveloped hydraulic sites. In several of the "have not" hydraulic provinces such as Ontario, there is the probability of some redevelopment projects for hydraulic peaking or the development of major pumped storage installations.

But for all intents and purposes, there are but two basic types of generation to meet the electrical energy requirements of the future - thermal plants fired by fossil-fuels or fuelled by uranium. For each province, and indeed for each country, it is not a question of if they will move to thermal, it is a question of when.

Ontario Hydro is a good example of the staging or phasing in of "primary" fuels for electrical generation.

The reason for the existence of Ontario Hydro was to develop the hydraulic re-

sources of the province. The Queenston plant at Niagara Falls, which began production in 1921, was the first "giant" step for Hydro. A continuing program of hydraulic development reached its apex in the fifties with the major developments of the Ottawa complex; the further development of the Niagara; a number of sites in north-western and northeastern Ontario; and one of our major installations delayed for many years because of its intriguing ramifications, political or otherwise - the St. Lawrence generating station.

Introduction of coal-fired plants also started in the fifties and the seventies saw the conversion of one of these plants, Hearn, to a so-called cleaner fuel - natural gas.

It is somewhat of an anomaly that Hydro is now being accused of burning an exhaustible premium fuel at Hearn. Somewhere along the line the environmentalists and others have forgotten the heat they put on us to convert that plant to natural gas a few years ago.

We hope to continue the policy of mixing fossil-fired plants, particularly coal-fired plants, along with nuclear stations as we move into the future. Some of these will be quite large, such as our 4,000,000-kw Nanticoke plant. There is no question, however, but that nuclear will assume the lion's share of our load growth.

The nuclear stage started with a 20,000-kw demonstration plant at Rolph-ton, followed by the 200,000-kw plant at Douglas Point (both owned by AECL). Now we have our exceptional performer, Pickering, at 2,160,000-kw, with its last unit to come on line in 1973. Next is Bruce, at 3.2 million kw, scheduled for service between 1975 and 1978.

The following table shows how nuclear will bridge the generation gap:

In 1960, 99.4 per cent of our energy was generated by hydraulic plants; we had 2,700,000-kw of thermal capacity in service that year, but it was mainly used for peaking. By 1970, 60.5 per cent of the energy came from hydraulic stations, 37.8 per cent from fossil-fired plants and 1.7 per cent from nuclear.

By 1980, we forecast that hydraulic stations will provide 27 per cent, fossil-fired 44.3 per cent and nuclear 28.7 per cent. By 1990, hydraulic will be down to 13.4 per cent, fossil-fired 28.2 per cent and nuclear 57.9 per cent.

Why the greater emphasis on nuclear? The answer is simply this: it offers the best means of achieving stability in future electricity costs and rates, it offers the best means of securing future fuel supplies, it offers the best practical solution to our environmental problems and it offers a practical solution for the conservation of the so-called exhaustible fuels.

To begin with the cost factor, the following table compares the costs of nuclear vs. fossil-fired stations in mills per kilowatt-hour:

The figures show nuclear as producing energy at the lowest overall cost. The main cost characteristic of nuclear stations is that they are capital intensive as compared to fuel intensive fossil-fired stations.

Nuclear stations cost about twice as much to build as fossil-fired stations and are therefore much more subject to inflation so far as the cost of borrowed money and the price of equipment and material are concerned. But once built, they are relatively inflation proof. A counter force, however, is the fact that the high capital costs of nuclear plants could present some major problems to Ontario Hydro in the raising of capital and necessitate greater dependence on internal financing, which of course can only be achieved through higher electricity rates.

From a fuel point of view, we expect that uranium will be subject to normal price increases due to rises in labor and other costs. On the other hand, as the industry is young, it is also reasonable to expect that there will be cost reductions due to technological innovations, especially with respect to processing. It is therefore probable that nuclear-fuelling costs will rise at a lower rate than general inflation.

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Grim prospects for Ontario

the energy growth curve over. That 4½ per cent annual rate of increase simply must become 4 per cent, then 3 per cent or less. But in doing this more effectively and fairly we will use more electricity, not less. To improve the quality of life, to reduce the threat to our environment and to reduce our demand for energy from fossil fuels will require vastly more quantities of electrical energy. The demand curve for electricity may, indeed, rise for a while at an even higher rate than at present. How do we do this? How do we reduce our total demand for energy and at the same time increase our supply of electrical energy?

In looking for the answer with ACE, I have been startled and appalled by the animosity both veiled and open which comes out whenever Hydro and the municipalities are discussed. We all agree that in a finite world there must be finite and definite limits to the growth of any species or resource-using activity. But is such instant hostility the way to solve a problem which will require our best reasoning and logic?

Do we limit growth by arbitrarily limiting the capacity to meet demand — by encouraging the adversary process which is now so large a feature of the American scene? Some say yes, echoing what we hear in the United States.

In the U.S., bound as they are by their regulatory procedures, this process and the endless court actions which result from the "adversary" thinking have reached a climax, or culmination, in the famous Calvert Cliffs decision against the Atomic Energy Commission.

The U.S. nuclear program was virtually stalled by the Calvert Cliffs court decision in July, 1971. More than 60 licensing applications involving more than 90 reactors were held up when the court ruled that environmental considerations laid down by the National Environmental Policy Act would affect all stations not licensed for operation as of January 1, 1970.

Calvert Cliffs is a nuclear power station on Chesapeake Bay in Maryland. The Atomic Energy Commission had

proposed that the new rules not take effect before March 4, 1971, but the Calvert Cliffs Co-ordinating Committee, the Sierra Club and the National Wildlife Federation filed suit against the AEC over its interpretation of its responsibilities.

We should learn now from the other fellow's experience. We do have time, if we will so learn, to avoid the excesses and the waste and the hardship which are the inevitable result of confrontation. We, the whole of the Hydro family in Ontario, exist for one reason and one reason only — to supply electrical energy to the people of Ontario as they need it and at cost.

We are ready and willing to minimize the adverse impacts involved in the generation of electrical energy provided there is full recognition of the trade-offs involved. We have, in fact, seen some of these adverse impacts before the general public saw them and have moved to lessen them. However, there cannot be a "risk-free" environment. There never has been. The choice cannot be one between absolutes, but rather must be between practical alternatives.

Where does this leave us?

First, we have to learn to live with a unit cost trend that, contrary to our experience in 1968, will rise and perhaps at an increasing rate. All over the world the price of all energy sources is rising. Why should we expect to be an exception? Of course we must continue to give the best for the least possible but we and our customers must accept new items of cost as well as greater cost for the accustomed ones. We must accept greater cost now to gain savings and greater leverage on cost 10 or 15 years hence.

But even though we do accept higher cost as a fact of life, let us not be persuaded or let others be persuaded that some of the traditional costs such as provision for reserves, sinking fund for debt retirement, depreciation and the like would be better lumped, or sunk, into some vague, unspecified, arbitrary rate of return which will put Hydro on a par with Consumers Gas or Union Gas

or Calgary Power or Mother Bell.

Second, we have to go back to the thinking of Detweiler, Snider, Pierce and Beck. Seventy-five years ago a dozen municipalities in Southwestern Ontario determined that they would not remain at the mercy of an external, foreign source for the coal they needed for their municipal electrical generating plants and by co-operative action secured for themselves an adequate supply of hydro-electric energy, the only indigenous source available then and throughout the years up to the building of Pickering nuclear station.

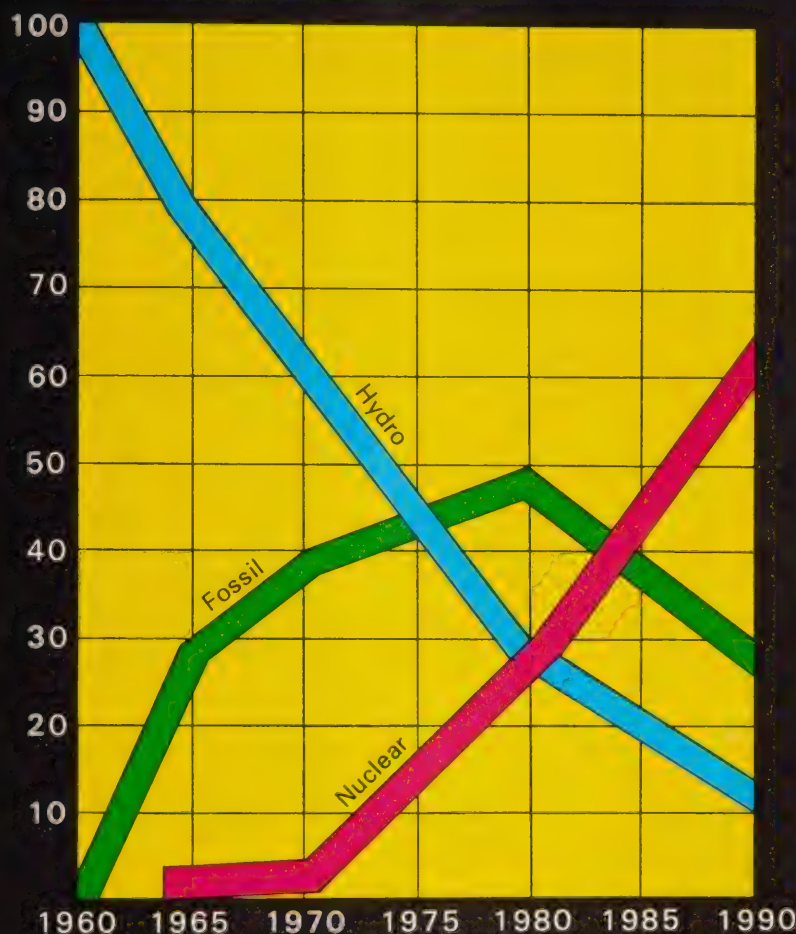
Those pioneers made electrical energy the keystone in Ontario's economic arch. It still is, but no longer is it wholly indigenous. Half our capacity is thermal and thus wholly dependent, until Pickering, on external supplies of increasingly scarce and expensive fuels.

Where do we turn to do again what the pioneers of Hydro did? Where else but to the latest and again, an indigenous and ample source — nuclear power from uranium and, in time, thorium. In the CANDU system we have the most promising and the most flexible of all of the nuclear power systems so far developed.

It works, as Pickering has shown. There will be problems, but those in sight look to be soluble. There will be environmental and ecological impacts but again, with co-operation and logic and reason these can be minimized. □

Nuclear bridges the generation gap

TREND TO NUCLEAR



In short, it might be said that once a nuclear station is built, the battle of rising costs has been won, whereas in the case of a fossil-fired station and what is happening to fuel prices, the battle may be only just beginning. As the table shows, fuelling is by far the most important cost factor for a fossil-fired station - ranging from just over 4 mills to 5 mills, depending on whether high-sulphur or low-sulphur fuel is burned. We know that the price we will pay for fuel in the future will rise considerably.

We also know that the overall cost of energy from fossil-fired stations will rise

in the future due to environmental controls. Either sulphur will be removed from flue gases, in which case capital costs will rise, or the sulphur will be removed from the fuel at its source, resulting in still greater increases in fuel prices.

All factors considered, nuclear stations appear to offer the best means of achieving stability in future electricity costs and rates.

A major reason why Ontario Hydro is moving to nuclear is security of fuel supply and the fact that large resources of natural uranium are available in northern Ontario, with further deposits

in Saskatchewan. Canadian deposits of natural uranium are quite extensive as shown here.

The Ontario deposits constitute about 80 per cent of Canada's total, are readily mineable, and comparatively cheap.

Looking at the western world reserve picture for uranium, we find that there is a "reasonably assured reserve," at less than \$10 per lb., of slightly over a million tons of U-308 and another additional estimated reserve of 1 million tons at the lower cost range. In the higher price range of \$10 to \$15 a pound, the "reasonably assured reserve" for the western world has been stated at 750,000 tons with an additional estimated reserve of 660,000 tons.

With respect to demands, Ontario Hydro has estimated that the requirement for the nuclear plants which we have already committed and those which we may commit in the next six years is about 70,000 tons for their 30-year plant life. The demand for uranium in the United States accumulative to the year 2000 has been estimated at 1.7 million tons and for the western world at 3.4 million tons.

These are very rough figures, but they point out one very significant factor: namely, Canadian uranium will be an increasingly important natural resource as the demand for uranium escalates. It is obviously important that Canada should take steps to reserve, assure and secure adequate supplies of natural uranium to satisfy the demands of its electric utilities to the year 2000 and beyond.

In the longer term, fusion and fast breeder reactors should take care of the nuclear fuel problems.

Yes, security of fuel supply was one of the major reasons why Ontario Hydro took the nuclear route and why we took the CANDU route. It provided the opportunity to burn a fuel indigenous to Ontario - natural uranium - and thus avoid the necessity of having to import highly strategic materials such as en-

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Nuclear bridges the generation gap

Costs of nuclear versus fossil fuel stations

(in mills per kilowatt-hour)

	Nuclear	Fossil	
		High sulphur fuel	Low sulphur fuel
Capital costs	4.60	2.39	2.39
Operation and maintenance	0.60	0.44	0.44
Heavy water upkeep	0.20	—	—
Fuelling	0.97	4.25	5.10
	6.37	7.08	7.93

riched uranium. The reason is just as valid today.

While heavy water is not exactly a fuel, it is certainly something to be considered when discussing the subject of nuclear generation. Indeed, the current shortage of heavy water has been one of the most discussed, if not one of the most controversial, issues surrounding the nuclear power program.

The initial failure of the Glace Bay heavy water plant, the problems involved with the Port Hawkesbury heavy water plant, the problems of borrowing and buying sufficient heavy water for Pickering have certainly caused both AECL and Ontario Hydro a great deal of concern.

When all the presently committed Canadian heavy water plants are in full operation, the potential output will be about 1,600 tons per year, which should be sufficient with some inconvenient short-term shortages to cope with our present commitment for nuclear

plants. However, in the future, if nuclear is used to meet the exponential rise in demand, heavy water facilities will have to be expanded to cope with the growth rate. Furthermore, the demand for heavy water will not be restricted to Ontario. As CANDU systems are installed in other provinces, and probably in other countries as well, there will be competing demands for existing heavy water production facilities.

In our view, there is no reason why appropriate steps cannot be taken to ensure that adequate heavy water production capability can be available to meet the needs of future CANDU power stations, not only for Ontario Hydro, but for other utilities in Canada. In other words, Canada has the technological and financial resources to produce heavy water to meet the requirements of its nuclear program.

The increasing public concern regarding the quality of the environment

obviously has important ramifications on the types of generation to be utilized in the future. We are sometimes accused of grasping at nuclear as the end-all and be-all solution to the environmental problem. While nuclear plants should ameliorate the concerns of the public with respect to air pollution from the generation of electricity, they raise other concerns such as thermal and radioactivity emissions.

It is true that nuclear plants discharge warm water used to condense steam from their turbines just as fossil fuel stations do; as a matter of fact, they discharge a little more warm water. With small rivers or small lakes, this discharge of warm water could present a problem and probably necessitate the construction of expensive cooling towers.

However, in Ontario we have a very significant natural resource in large bodies of water such as the Great Lakes to readily dissipate the effects of these discharges, and so-called thermal pollution is not expected to become a problem. Compared to solar heat inputs, the man-made heat rejection is infinitesimal, but attention has to be focussed on each situation, even for plants on the Great Lakes.

Unfortunately, little is known about the effects of thermal emissions and we are conducting extensive studies and are co-operating fully with the Ontario Ministries of the Environment and Natural Resources, and the Canada Centre for Inland Waters on our plant locations. The biological phase of these studies includes a look at plant and animal life in the area surrounding our generating stations, at such things as temperature changes, experimental fishing, fish-tagging and netting, studies of bottom fauna, aquatic weed growth and water sampling.

For new sites, physical environmental data on such factors as winds, currents, water temperatures, weed growth and ice formation is collected to design the intake and outfall channels. The information is built up in greater and greater detail until the station goes into service, and when the plant is in opera-

Uranium reserves and resources in Canada, 1970

(tons of U308)

	Reasonably assured resources (reserves)	Estimated additional resources
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Less than \$10/lb.	232,000 tons	230,000 tons
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\$10 - \$15/lb.	130,000 tons	170,000 tons
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primary energy fuels? For example, I think you would agree that as we look ahead 20 years, coal will be used by a relatively few large users who can afford to design around its inconvenience to realize the savings inherent in what is currently looked upon as the least desirable of fossil fuels.

It is further reasonable to expect that oil will continue to dominate the transportation field and probably become increasingly important as a chemical feedstock. Natural gas, on the other hand, will continue to be used as a domestic fuel and for specialized industrial purposes.

In this longer-term context, with the emphasis on nuclear power, electricity will not only provide for a cleaner environment but it will also play a major role in conserving other premium fuels such as natural gas and oil for the uses for which they are especially adapted.

We at Ontario Hydro are convinced that nuclear power will bridge the generation gap. □

tion, data is monitored to note any change.

The second concern or question raised is "to what extent is the public exposed to the 'radioactive fallout' generated by nuclear power stations?"

All nations involved in nuclear power programs undertake rigorous monitoring of the environment in the vicinity of the power plants. In Canada, Ontario Hydro, AECL, and public health authorities have been monitoring local environments for a number of years and the results have consistently shown that levels of contamination in the environment outside the exclusion areas are indistinguishable from natural background radiation.

To quote from a brochure published by the Canadian Nuclear Association: "Radiation released from nuclear power plants is extremely small. In fact, if a person were to stand at the boundary of such a plant continuously for 365 days of the year, he would receive only about one or two millirem. As a comparison, a worker on the 56th floor of The Toronto-Dominion Centre would receive about 2 millirem more than a worker on the ground floor because of cosmic radiation." Furthermore, the protective

systems built into a nuclear power station, such as Pickering or Bruce, are such that even the most improbable nuclear accident would be contained within the plant, and local environmental contamination would be minimal.

One form of pollution that cannot be overlooked these days is aesthetic pollution. But while a nuclear plant cannot be hidden, much can be done to make it attractive. At Pickering, for example, we are establishing an 81-acre park, with half of the area landscaped and including a public beach and the other half maintained as a bird and wildlife sanctuary.

I think you will agree that if we are really concerned about the conservation of natural resources and concerned about the environment, that we have to look at the total energy picture. And in the long haul with nuclear as the primary fuel, electricity surely must be a solution, not a problem, for those who are worried about the conservation of natural resources as well as for those indicated earlier who are worried about pollution and protection of the environment.

At this stage, should we not be thinking about the longer-range uses for the



A VEHICLE FOR ALL SEASONS

by Rae Hopkins

Armchair moonwatchers following the last three Apollo missions have been treated to the spectacle of a multi-million dollar battery-driven buggy careering over the trackless wastes at speeds up to 12 miles an hour. Here on earth, the off-highway vehicle plays a more prosaic role, albeit one of major importance.

Roadbound no longer, people are turning to the snowmobile, the dune buggy and most recently the hovercraft in their leisure time. To the electric utilities, though, the off-highway transporter is a vital tool.

Ontario Hydro can provide a vehicle which will go virtually anywhere, anytime, in any kind of weather. Some of them even operate over terrain similar to the moon — geological formations around Sudbury bear such a resemblance to lunar features that the area is on the visiting list for astronauts-in-training.

Flagship of the fleet is the Foremost, a 29-ton, double-track vehicle that looks something like a cross between a Sherman tank and a crane. Its job is to lift linemen up to 75 feet in the air in insulated buckets where they can work on "live" 500,000-volt lines.

It reduces muscle work and fatigue by eliminating tower climbing, enabling senior linemen to work aloft with younger crew members.

An articulated vehicle with an over-all length of 41 feet and a speed of 12 miles an hour under good conditions, the Foremost is particularly suited for use in muskeg or snow.

Developed in Calgary, Foremost tracked vehicles were originally designed to cross

the Alberta oilfields. The one in Hydro's fleet has a standard undercarriage and power train, but that's where the similarity to a production model ends. The vehicle was shipped to Niagara Falls to be fitted with boom and buckets. The cab was designed to be about half the size of a standard Foremost cab to allow for stowage of the aerial device, boom and arms and still keep its over-all height within limits that permit unrestricted movement by float on all Ontario highways.

George Morton, Hydro's off-highways transporters officer, says most such vehicles are tailored specially for the customer. The use to which they're put often differs vastly from the manufacturer's intended purpose.

"At Hydro, we buy tracked vehicles for mounting aerial devices, radial boom derricks, or auger derricks for pole-setting. The vehicle itself is only a means of transporting men and equipment to locations inaccessible to standard means of transportation," Mr. Morton says. Some of the modifications are done by Hydro personnel at the Etobicoke service centre; some are done by outside suppliers.

The smallest tracked vehicle in the Ontario Hydro fleet is the snowmobile. About 250 of these ubiquitous machines have been readied for use this winter, mainly for linemen who traverse snowbound rights-of-way.

Basic workhorse is a twin-tracked, single-ski model providing transportation for two-man crews. It is used to tow light sleighs loaded with tools and materials and can pull a 40-foot power line pole if necessary. Hydro also has a number of single-track,

twin-ski models identical to those used for recreation.

Snowmobiles can be used from about 50 days a year in Southern Ontario to about 80 days in the northern parts of the province.

With nearly 500 off-highway vehicles of all shapes and sizes, the Hydro fleet is worth about \$2,800,000, but it's an investment which has paid for itself many times over in terms of hours saved in the construction and maintenance of vital power facilities.

One of the most recent additions to the inventory is the Vermeer tree spade, a giant hydraulic device capable of digging up and transplanting trees 15 to 25 feet high.

Mounted on a powerful tracked vehicle equipped with a front end blade, the machine removes a tree from its natural setting by forcing four hydraulically powered triangular spades into the ground around the tree. The spades cut a cone of earth containing the root ball, thus minimizing damage to the root system.

The tree is sprayed with an anti-desiccant, a plastic film that prevents dehydration and which breaks down in sunlight, and is then transported to a pre-dug cone-shaped hole. It fits perfectly because the hole is dug either by the same spade that uproots the tree or by a special auger.

"At one time, tracked vehicles were the predominant off-highway mode of transportation, but now rubber-tired articulated vehicles are running about equal in our fleet," Mr. Morton says.

Tracked vehicles are particularly useful in soft ground or muskeg while vehicles with tires are used predominantly on rough or

rocky ground, like the moonscape around Sudbury, for example.

While they're catching on fast as a leisure-time run-about, there's only one all-terrain vehicle (ATV) in the Hydro fleet. Often called off-road utility, go-anywhere, multi-purpose, and all-season vehicles, ATVs are attributed with anything, anywhere, anytime capabilities. But few designs, if any, meet true all-terrain requirements. They usually fit into subgroups biased toward certain conditions or terrain.

Forexample, multi-wheel, soft-tired types work well on hard, rough ground and in some muskeg conditions. Largely due to flotation of their tires, they can be used to cross short stretches of water as well.

Articulated units are adept in rough terrain while tracked types have good all-round versatility and wheel-track combinations seek to meld the best features of both basic types.

Mr. Morton believes there's not much chance air-cushion vehicles will become suitable for utility work for some time to come. "We're most anxious for the manufacturers to develop commercially viable ATVs suited to conditions in Ontario, but so far they haven't," he says. However, some pilot models weighing up to 25 tons are under development, and are expected to suit the conditions of the Mackenzie River delta area and the north slope of Alaska.

Most operators of large off-highway fleets are aware of the potential erosion problem that can be caused through the use of heavy equipment.

"We're very careful not to use vehicles

that could cause any undue soil erosion," says Mr. Morton. "We're prepared to supply a vehicle that will be kind to the ecology." Most of Hydro's rubber-tired vehicles are four-wheel-drive articulated vehicles with a maximum ground pressure of 10 pounds per square inch. This is well within acceptable limits, he adds.

The versatility of off-highway vehicles has been recognized since the introduction of tanks broke the stalemate of World War I trench warfare.

Indeed, the tracked vehicle still predominates. One of the most spectacular developed by a U.S. firm, scales inclines of more than 35 degrees, negotiates swamps and snow, and climbs over downed timber rocks and other hazards.

The vehicle has four tracks and 10 speeds, eight forward and two in reverse. It is being used by Portland General Electric Co. to reach lines previously inaccessible to ground transportation.

On other fronts, sales of off-highway equipment are booming. Foremost International's sales manager, Sandy Harvie, says his company received orders totalling \$7 million last year. "Since then, the Russians have ordered \$9 million in vehicles from us for use in Siberia," he adds. □



daddy longlegs lighting

Toronto's 401 highway with its mercury vapor lights is considered one of the best illuminated stretches of highway in the country. Its 50-foot-high towers provide excellent illumination, but according to some engineers are not the answer to the growing carnage on our roads.

Shining brightly on the horizon is a form of highway illumination known as high-mast lighting. The idea is to mount powerful lights on towers up to 200 feet high. The concept is growing in popularity and is considered one of the best answers yet for improved lighting at major traffic interchanges.

Picture entire highways brightly illuminated in this manner, perhaps even using electricity beamed from global satellites tapping the energy of the sun. It's not as much a pipe dream as it sounds according to R. P. Lindsay, marketing manager for the Holophane Company, of Brampton, Ont. Mr. Lindsay did a little crystal ball gazing in Ottawa at the AMEU's conference.

"No doubt all of you have seen 401 around Toronto with its excellent, much publicized 50-foot lights. But are you familiar with what is happening now with 100-foot, 150-foot and even 200-foot mounting heights?" he asked.

"The advent of very high luminaire mounting heights has provided lighting benefits not possible with conventional systems designed several decades ago. The high-mount system has demonstrated superior capability of seeing with greater safety, convenience and comfort."

Mr. Lindsay says several high-mast installations are now in operation in

Canada. One of the first was near Winnipeg; a second is outside Edmonton. He noted, too, that Hydro-Quebec is becoming increasingly interested in the idea and will be installing high-mast towers at transformer stations.

Such towers cost about \$25,000 apiece. While the lamps themselves are designed for long life, provision must be made to change them when they burn out. In some cases, the mast is lowered to the ground; in others, the fixture itself can be lowered almost like a flag. But in Quebec, the plan is to install elevators within the towers themselves enabling a serviceman to get to the top.

Mr. Lindsay told the AMEU that the emphasis on high-mount lighting comes as a result of considerable research. It has been established that the human eye can assimilate only five bits of information a second. This means that at 60 miles an hour, the eye can only scan about 20 feet. A driver's eyes, then, need all the help they can get at night.

Increasing the height of highway lighting provides more effective distribution of light on wide roadways and interchange areas. It gives less glare, more comfort and better visibility.

According to Mr. Lindsay, there are other advantages . . . lower maintenance costs because of fewer luminaires per mile and a lower chance of collision damage because of fewer poles and better placement.

From an environmental point of view, engineers suggest that high-mast lighting provides better appearance with no daytime "forest of poles and night time constellation of confusing lights."

The interest in high-mast or tower lighting is not new. Similar installations were made in many U.S. cities before the turn of the century and in Austin, Texas, a system installed in 1894 with 194-foot towers is still in use.

It was fitting that Mr. Lindsay should discuss high-mast lighting in Ottawa. That city was the first community on the continent to adopt a city-wide electric street lighting program. It also experimented unsuccessfully with a tower lighting project in 1892 outside Christ Church Cathedral.

Mr. Lindsay predicts that high-mast lighting, if it becomes universal, will cut down on accidents caused by glare.

"Within the total visual environment, motor vehicle headlights contribute considerably more glare than fixed roadway lighting systems. It is technically possible to control objectionable glare from fixed lighting, but this is not possible for vehicle headlights without sacrificing visibility distance.

"While headlight designers can increase candlepower for added visibility distance, the problem of increased blinding glare from approaching vehicles drastically reduces visibility during the critical moments of passing. Tests have shown that increasing the upper beam candlepower by 320 per cent only increased the seeing distance in the range of 20 to 30 per cent at a speed of 40 miles an hour. However, the viewing distance was reduced to less than one-half when cars approached one another."

Statistics show that thousands of motorists are killed or injured each year because of inadequate illumination on the nation's streets and highways. Poor lighting has exacted its toll of pedestrians. It has also contributed to crimes of violence, burglaries and car theft.



Intersection in Austin, Texas, is brightly illuminated by high-mast lighting.

A hushed crowd of utility executives sat in the Chateau Laurier's Adam Ballroom in Ottawa while two men manipulated a telephone and teletype apparatus.

At a nearby microphone, Roger Medlin, from the meter division of Westinghouse Electric Corporation, Raleigh, North Carolina, described the process. It was a demonstration of remote meter reading. The two men were dialing the area code and a special number to cut into a circuit somewhere in Florida to read the electric, water and gas meters of 10 homes involved in an experimental project.

Only trouble was that every time they dialed, they received a coded message on the teletype that the homes were out of service.

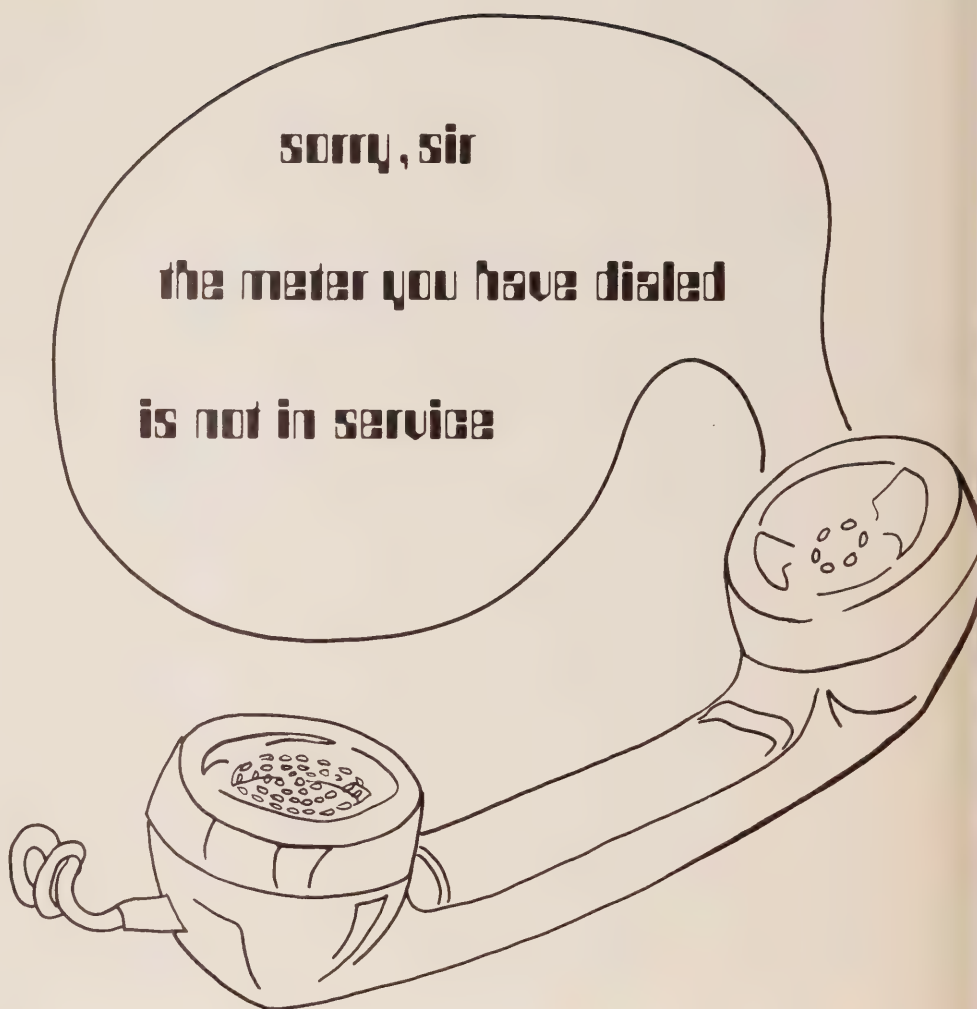
After several efforts and a few red faces, Mr. Medlin used his own coded card and read the electric meter in his laboratory at Raleigh. The demonstration was a success, and captured the interest of AMEU delegates.

Earlier, R. J. Hester, of Guelph, had shown a film on how computers have helped the Houston Lighting and Power Company to improve its operations and the handling of customer accounts, inquiries and complaints.

D. E. Shipston, of London PUC, discussed financial reporting to municipal hydro commissions. He said that well-designed financial reports are often an effective means of assessing and analyzing the performance and potential of all, or part, of a utility's operations.

He said the need for more and better organized information has clearly demonstrated itself. "The political and economic climate associated with the electrical utility field in Ontario today is thrusting upon commissions increasingly complex problems affecting the policy-making process. To discharge their stewardship, commissions require and should receive the best possible information available to assist them.

"We must recognize that the small utility often has limited capability and sophistication to research and produce detailed financial reports. It can also be truthfully said that many small utilities are not providing reports of considerable value to both manager and commission — notwithstanding the limited means at their disposal."



Mr. Shipston said data found in financial reports could be described as either historical or a forecast of what is expected or projected to take place. "Very often, the interpretation of historical fact can be usefully applied to what may be a difficult task of forecasting future financial requirements."

Mr. Shipston discussed the various formats that could be followed in financial reports and suggested that much could be said for the adoption of a standard vocabulary of financial terminology to be used by all utilities. "Then, perhaps, commissioners, managers and staff from different utilities will communicate between each other in the sure knowledge the financial apples and pears in one utility are the same apples and pears to another."

He urged those attending to call on Ontario Hydro's municipal accountants to help in instructing staff and in designing reports.

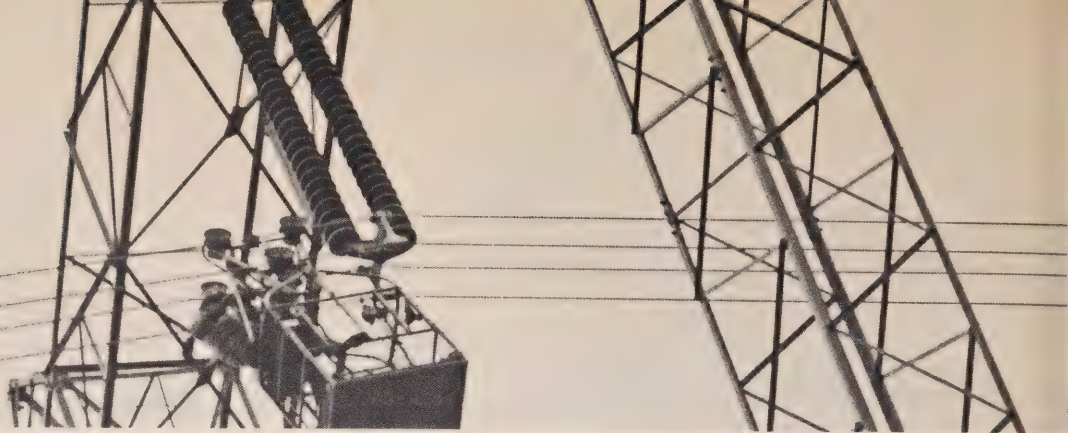
Speaking on the subject of Canadian independence and the U.S. subsidiary, R. D. Richardson, an executive of Canadian General Electric Company, said that while this country is small in both population and wealth, its industry and its power utilities have attained a high level of productivity by international standards through demanding the most technically sophisticated equipment and processes available in the world.

"Its people also demand the latest features in consumer goods and conveniences. Canadian industry must have available to it, currently and at competitive costs, the most advanced technology in the world if it is to meet the demands. This need for technical information has largely been answered by foreign ownership of most of Canada's science-based industries," he said. □

Electric meter in a laboratory in Raleigh, North Carolina, is "read" over the phone at AMEU's Ottawa conference.



along hydro lines



Hydro a Crown Corporation

Subject to approval of the Legislature, Ontario Hydro will become a Crown Corporation. The decision was taken by the government on the recommendation of Task Force Hydro.

The new corporation will have a president and a board of directors which will report to the Legislature through a Minister Without Portfolio. Hydro Chairman George Gathercole will remain as chairman of the board, Premier William Davis said.

Mr. Gathercole will play a key role in relations with the government and the general public and will work with the president of Hydro to ensure that the board of directors has full access to technical information and all other data required from the corporation.

The Hydro Corporation proposal was one of 32 in the task force's role and place study. Premier Davis said he would not comment on further proposals until they had been discussed by cabinet because he did not wish to prejudice further reports from the task force. Yet to come are studies on the organization, nuclear power program, power costing and rates philosophy, external financing and a "make or buy" policy.

The role and place report recommended that the Hydro Corporation board be made up of the chairman, appointed for a five-year renewable term, two representatives nominated by the Ontario Municipal Electric Association, two senior civil servants and five members at large. The president would be an ex-officio member.

The premier rejected the idea of appointing the two civil servants, saying their appointment could come too close to making the Hydro Corporation another government ministry.

Although Hydro must fulfill its mandate under the broad policy direction of government, the report recognizes there are compelling arguments favoring a clear and distinct separation between Hydro operations and those of government.

Citizen participation

Task Force Steering Committee Chairman J. Dean Muncaster, president of Canadian Tire Corporation, described the change to a crown corporation as "largely philosophical" in as much as the crown corporation would be responsible for the management of a commercial operation involving the supply of services to the public and ordinarily would operate without parliamentary appropriations.

While commending Hydro for its past achievements and the contributions it has made to the development of Ontario, the task force said the utility cannot fulfill its total obligation to the public by simply meeting demands for electrical power at the lowest feasible cost.

The trends in society suggest that this objective may be difficult to accomplish if a means is not found for citizen involvement from the early stages of planning for generation and transmission facilities, the report said. It stressed that this participation should include decisions on location and construction.

Waterloo PUC pioneer dies

Eby Rush, former superintendent of Waterloo PUC, has died after a lengthy illness. He was 82.

The opening of the city's Eby Rush transformer station in 1963 marked the culmination of a distinguished career for Mr. Rush. He is pictured with former Ontario Hydro chairman W. Ross Strike, on the right, at that ceremony.



A distinguished career

Mr. Rush served 45 years with the utility and retired in 1955. He was superintendent for 16 years and the first superintendent to have charge of all three PUC departments: water, electricity and gas. He joined the utility in the days of water wheels, arc lighting and a two-man staff. In 1911, Mr. Rush assisted at the turning on of Waterloo's street lights and in 1955 he was on hand to help switch on new fluorescent lighting.

New OMEA officials

A number of new officials were elected at the fall round of OMEA district meetings in Honey Harbour, Dryden, Sturgeon Falls and Stratford. The following photographs show some of the commissioners who'll be running the association over the next 12 months.

District 3



Marv Kelly, secretary-treasurer, Atikokan; Frank England, Kenora; Gino Caccamo, Schreiber; Webb Calder, president, Atikokan; Jim Currie, past president, Thunder Bay; W. W. Laakso, 2nd vice-president, Thunder Bay, and Don Bainbridge, Atikokan. Also elected: Ed Hawthorne, 1st vice-president, Dryden, and Ed Ariano, Sioux Lookout.

District 6



Seated: D. M. Seath, secretary-treasurer, Stratford; Archie McGugan, past president, Palmerston; D. R. Larkworthy, president, Stratford; J. M. Lind, 1st vice-president, St. Marys; W. A. Smith, 2nd vice-president, Waterloo. Standing: C. J. Seltzer, Tavistock; A. T. Brown, Galt; G. Filsinger, Goderich; W. S. Smith, Fergus; E. D. Constant, Hespeler; W. Gerth, Milverton, and H. Doering, Wellesley. Also elected: C. C. Smith, Guelph; L. Breithaupt, Kitchener, and A. R. Garon, Clinton.

District 2



From left, seated: G. C. Tudhope, 2nd vice-president, Parry Sound; W. E. Theaker, past president, Paisley; N. H. Robertson, president, Owen Sound; W. G. Boyes, 1st vice-president, Alliston. Standing: H. J. Murphy, secretary-treasurer, Barrie; Ross Densmore, Arthur; James Church, Bradford; John McNab, Orangeville; H. J. Cameron, Kincardine, and C. J. Larsen, Walkerton. Also elected: J. S. Darling, Burk's Falls, and W. L. Logan, Midland.

District 9



Seated: Jesse Goodman, 3rd vice-president, Espanola; Bruce MacPhail, president, Capreol; Victor Gardi, 1st vice-president, Sault Ste. Marie; Rollie Marleau, past president, Sturgeon Falls. Standing: Joseph Bloemmen, Coniston; Raoul Vaillancourt, Hearst; George Fitzsimmons, South River; Ron Duncan, secretary-treasurer, Coniston; Wes Cooke, North Bay, and Ralph MacKay. Also elected: Ken Rochon, 2nd vice-president, Cochrane, and Albert Tremblay, Chapleau.

Let's flex muscles

Commissioners attending OMEA district meetings this fall were urged by OMEA president Archie McGugan to lobby their MPP if they disagreed with the upcoming recommendations of Task Force Hydro.

"What are you going to do as commissioners if and when this report is made public?" Mr. McGugan asked. "Remember, this is a report of a study group to the government. Government is the court of last appeal. They are the people who will make the decisions and prepare the legislation we will have to live by.

"Governments will only react to the voice of the people," he added. "That is their responsibility. Contact your local member, discuss it with him. Write to the premier of Ontario. He would certainly welcome your thoughts and ideas.

"We have a powerful organization in the OMEA with a lot of muscle. But you know what happens to a muscle which is never used."

Putting the Task Force study into historical perspective, Mr. McGugan said the present administration at Queen's Park had embarked upon a massive program to modernize many established institutions to enable them to cope with the rapid growth and complexity of modern society.

The Committee on Government Productivity was created, he said, to eliminate costly duplication and provide a co-ordinated and efficient operation within the government administration. Out of this study had emerged super ministries formulating policy, and lesser ministries

charged with putting that policy into practice.

"This concept of a distinct separation between the policy group and the administrative function seems paramount in the thinking of COGP," he added.

The committee then turned to the problem of boards and commissions. It was recognized that Ontario's phenomenally successful publicly-owned electrical utility was a special and unique institution for many reasons. Among these were:

1. Its size – capitalized at about \$5 billion.
2. Its rapid growth – power demands doubling about every 10 years.
3. Its vital importance in the daily life of every citizen in Ontario.
4. Its contribution to the industrialization of our cities and towns and to the productive capacity and standard of living on our farms.

Safeguard employees

One of the AMEU's greatest concerns about Task Force Hydro is that employee benefits and working conditions be safeguarded, association president Don White told OMEA district meetings this fall.

"We have been hoping some decisions will soon be reached and announced. The Task Force investigations have stretched over some 15 months and a degree of uneasiness has developed among Hydro people," he said.

"We do take the view that some redefinition or reaffirmation of the role and place of Hydro in Ontario is desirable. The day

is gone when we, Ontario Hydro and the utilities can go around waving the Power Commission Act or the Public Utilities Act as our authority to proceed as we please. The Solandt Commission in response to citizen reaction is clear evidence of this."

Mr. White said his organization viewed with concern proposals to impose upon Hydro artificial requirements for internal financing. The AMEU also found the comparison of Hydro's rate of return with that of the gas and oil companies odious.

"Our objective is service to the people of Ontario. There is no profit to shareholders. We ask ourselves why should the electric consumers of Ontario decide to own their own system to get low-cost electricity then turn around and charge themselves rates over and above legitimate operating and financing expenses just to produce a rate of return equal to some commercial enterprises which may, or may not, be efficient."

On the subject of marketing, Mr. White said that between 1960 and 1971, the gas and oil industries persuaded more than 4,500 customers of his own utility, North York Hydro, to change from electric water heaters. The cumulative loss in revenue amounts to more than \$1¼ million and losses are continuing at a rate of more than \$250,000 a year.

"The sad part is these very same customers are paying a good deal more to the gas and oil people, only they do not know it nor can they measure it," he added.

"Another measure related to my own utility indicates that our annual load factor improved during the sixties from about 50

per cent to 60 per cent. I hasten to admit this is not entirely a credit to our marketing effort, but certainly a good deal of it is. But I measured what would have happened had we not had this improvement. At the very least, in the years 1965 through 1971, we would have needed \$7½ million in borrowed money and our needs could have amounted to as much as \$20 million."

Growing fast

Ontario Hydro's submission to the Ontario Advisory Committee on Energy (ACE) predicts an increased growth for electricity which "may increase its share of the total Ontario energy market from one-fifth at present to one-half over the next three decades."

The report, presented by Hydro Chairman George Gathercole, concludes that electricity can help conserve other fuels and is the form of energy most compatible with the environment. Use of nuclear reactors offers a means of stabilizing and minimizing future electrical rates and costs.

Since the summer of 1971, ACE has undertaken wide-ranging research into the many facets of energy supply and economic growth. Its work is closely related to the studies of Task Force Hydro in some areas.

Arnprior plant goes ahead

Construction of a hydro-electric station at Arnprior on the Madawaska River will begin this year or early next. The move follows approval of the project by the provincial government.

The new plant will operate by remote control and will ensure peaking operations of other stations on the Madawaska — Stewartville, Barrett Chute and Mountain Chute.

Construction of an artificial lake, about 10 miles long, extending from Arnprior to Stewartville generating station, will help correct erosion problems on the river and provide new recreational possibilities.

The Arnprior station's two units will have a combined capacity of 87,000 kilowatts. It will cost \$54 million and will employ about 700 people at the peak of construction.

Electrical man of the year

Lorne McConnell, director of Ontario Hydro's thermal generation division, was presented with a plaque recognizing him as Electrical Man of the Year at the annual conference of the Canadian Nuclear Association in Ottawa. Mr. McConnell was chosen for his contribution to Hydro's nuclear program and to getting the Pickering nuclear station operating successfully. The award is given each year by Electrical News and Engineering magazine.

Explaining the award to delegates, Cy Summerfield, vice-



Lorne McConnell

president of Southam Business Publications, stressed that it is not given for routine service.

"The award is given for exceptional service," Mr. Summerfield said, "and this year our winner fits the bill perfectly."

When Mr. McConnell was appointed Hydro's nuclear operations engineer in 1963, said Mr. Summerfield, he little dreamed that in less than 10 years' time the Commission would have two 500-megawatt units on the line.

"But it did happen and Lorne McConnell is one of the reasons it happened."

Heavy water

Atomic Energy of Canada Limited and Polymer Corporation have reached an agreement to collaborate in the development of new processes for the production of heavy water.

For some years, research into new methods of heavy water production has been carried out at AECL's Chalk River nuclear laboratories. Under the terms of the agreement, Polymer will take the lead position in the develop-

ment work and will build and operate experimental facilities at Sarnia. Expenditures of between \$1 and \$2 million a year are expected.

In existing heavy water production plants in Canada, heavy water is separated from ordinary water with the aid of hydrogen sulphide. Two new production methods being considered are a steam-hydrogen-amine process and a hydrogen-water process.

The steam-hydrogen-amine process involves the removal of heavy hydrogen from steam with the aid of ordinary hydrogen. The heavy hydrogen is then concentrated with the aid of an amine, a compound formed from ammonia. In the hydrogen-water process, heavy water is removed from ordinary water with the aid of ordinary hydrogen and a catalyst developed at Chalk River.

Potential advantages of the new processes are lower capital cost, lower energy consumption, smaller equipment, less corrosion and elimination of hydrogen sulphide from the system.

Fuel vaults

Rather than bury its radioactive wastes in abandoned mines or man-made cavities, Canada intends to store spent radioactive fuels in above-ground, specially constructed buildings.

AECL says the first of the "engineered storage facilities" is likely to be built in the mid-1980's somewhere in Ontario to handle the accumulating wastes from nuclear reactors at such

stations as Pickering and Bruce.

Each building will be designed to last about 100 years, by which time it is hoped that better techniques for disposing of nuclear wastes will have been found. It takes about a million years for all the radioactive components of spent fuel bundles to decay.

Engineered storage facilities will represent the second phase in the long-term storage of spent reactor fuels. Spent fuel bundles are first placed in special water-storage bays at Canadian nuclear plants, where they will remain for a number of years while most radioactive.

Professionals, he says

Perhaps environmentalists are more effective because they are becoming more professional, D. J. Gordon, general manager of Ontario Hydro and outgoing president of the Canadian Electrical Association, told members attending the annual conference in Jasper, Alberta.

"Government, industry and environmentalists are adopting a more professional and sensitive stance in dealing with pollution," he said.

"Industry has a deepening and continuing concern about its impact on the environment," he told the meeting, adding that the public is becoming increasingly aware they may have to pay higher rates for electricity if they want a cleaner environment.

municipal briefs

Cornwall Street Railway, Light and Power Company Ltd. has changed its name. From now on, it will be known simply as Cornwall Electric. "This change of name will recognize the new era entered into last year when the company discontinued both its transit and freight services to concentrate its operations in the electric utility business," says general manager G. R. Fairweather.

James H. Roughley has been appointed manager of Brockville PUC to succeed Henry Little, who has retired. Mr. Roughley joined the utility in 1956 after four years with Ontario Hydro. He graduated from Ryerson in electrical technology in 1952.

Ronald D. A. Kidd steps into the position of engineer-manager of Cochrane PUC to replace Ray Slavickas, who resigned to study at the University of Toronto. Mr. Kidd holds a Bachelor of Engineering degree from the Nova Scotia Technical College and a Bachelor of Applied Science degree from the Royal Military College, Kingston. From 1966 to 1969 he was navigating, deck and communications officer aboard HMCS Kootenay.

Robert Service, assistant manager of Carleton Place Hydro, has been appointed manager of Kemptville Hydro.



as don wright sees it

It's just a coincidence, of course, but it's odd how some relatively insignificant and run-of-the-mill creature or event will suddenly enjoy a flurry of publicity in the national press and then sink back into obscurity. This time it's rats.

Two University of Toronto geniuses have the scientific world in a tizzy over a sure-fire method they claim to have discovered for picking out the winner after a rat fight. Writing in the *Journal of Comparative and Physiological Psychology*, they report that after a fight, the victor invariably goes in for a lot of grooming.

Get the significance? These people are saying that grooming behavior is a consistent index of social dominance and is quite independent of the biological state of the animal. What's more, they are hinting at the possibility that a basic need to groom may exist, "bearing in mind the behavior of victors after a fight."

Even if we fail to grasp the full implication of the thing, it's a handy tidbit to store away for future reference. For one thing, we intend to keep our distance next time we meet a well-groomed rat. He's bound to be pretty handy with his dukes.

■ Nor should we look down our noses at the disheveled, down-at-the-heels type rat. He and his well-groomed bretheren just might lead us all down the path to the fountain of youth.

According to a report in the *Globe and Mail*, medical researchers have discovered that rats live up to 20 per cent longer if their caloric intake is cut throughout their lives to 60 per cent of normal. If human beings react like rats, and some certainly seem to, then it's only a matter of turning down that second helping and the next generation will all reach the century mark.

There may be a problem, of course, in getting infants to volunteer for a life-time regime of semi-starvation. And then it will take about 80 years to find out whether it works or not.

Nevertheless, gerontologists are already looking into the effects of longer lifespans. One points out that population control is the only alternative to world disaster so that the pattern of the future looks like "zero population growth with long-term people."

Sounds like a nice arrangement for those who make it out of the womb and those that never get started won't know what they're missing.

■ Rats, of course, are not necessarily all made of sugar and spice and it would be a mistake to treat them with too much deference based on their contributions to the science laboratories. They're still a shifty lot and, according to *Time* magazine, very adaptable.

The rat family's number was thought to be up with the development some years ago of one well-known anti-coagulant. A few crumbs of this substance was enough to do in the finkiest rat within a matter of days.

Not any more. Rats have recently been observed smacking their lips over a bowl of the stuff – appearing to prefer it three to one over rolled oats or cornflakes.

"Clearly a new strain has developed," says *Time* – "the super-rat." What's the next step in rodent control? Cats are out. They've grown fat and lazy, we're told, on canned foods and other readily available goodies of the affluent society, and have lost the urge to hunt. Snakes, mongooses and ferrets are suggested as possible alternate control measures but this seems like a case of the cure being worse than the disease.

Perhaps we should get out of the fat-cat-super-rat race entirely because the outcome will inevitably be settled in the bedrooms of the rodents – the place where the bewiskered gentry have managed to thwart man's effort to control them for thousands of years.

The average female produces up to 12 litters a year – each litter consisting of 10 ravenous little rats. Stand by for super-rat.

■ Just one more rat reference and this only because the news is too monumental to miss. A scientist writing in *Nature* has found that, by subjecting certain areas of the brain to tiny electric shocks, rats can be made to yawn. Why all the excitement? As this fellow points out "the findings may provide insight into the central mechanism of yawning, of which little is known."

Some things *are* known, of course, and one is that the central mechanism for

yawning is likely to be activated in the masses by too much investigation into the central yawning mechanism.

■ Harking back to the fat-cat bit for a moment, we were amused at reading a "help wanted" ad in a leading science journal looking for an "animal behaviorist." They were pretty sticky as to requirements.

Aspirants were expected to have a "first" degree with the emphasis on physiology, psychology or animal behavior. They also wanted post-graduate work in the measurement of animal motivation with several years of related experience. The ability to prepare learned papers for publishing was another stipulation.

Who do you suppose would require such an egghead? "One of the world's premier manufacturers of pet foods," no less, so our man of many talents will be putting them to work concocting succulent recipes for the dogs and cats of merrie old England.


State-side statistics tend to suggest that life is just a bowl of cherries for the fur, finned and feathered folk on this side of the ocean as well. The U.S. pet population is nearly three times greater than the number of humans and about three billion dollars was spent last year for the purpose of feeding, lodging, care and grooming of dogs, cats, goldfish, turtles and what have you.

No wonder the cats of today have lost interest in nasty old rats.

■ Finally, we feel compelled to draw attention to a scientific endeavor of a rather unusual nature, but one whose value will immediately be apparent to our readers. It's been established by sound observation techniques and laboratory methods that homosexuality does occur among female cats during oestrous periods, but not so often as it does among dogs and guinea pigs.

This particular bit of work was made possible by grants from the Science Research Council.

Too little attention has been paid to this area, in our humble opinion, and the reason for this neglect escapes us. At the same time, we are thoroughly ashamed of the dogs and the guinea pigs. □

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